

STATE OF CALIFORNIA
Energy Resources Conservation
and Development Commission

DOCKET

11-CAI-02

DATE SEP 12 2011

RECD. SEP 12 2011

In the Matter of:

Complaint Against Ormat Nevada, Inc.
Brought By California Unions for
Reliable Energy

Docket No. 11-CAI-02

PREHEARING CONFERENCE STATEMENT
OF
CALIFORNIA UNIONS FOR RELIABLE ENERGY

September 12, 2011

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Attorneys for the CALIFORNIA
UNIONS FOR RELIABLE ENERGY

Pursuant to the August 19, 2011 Notice of Prehearing Conference and Evidentiary Hearing, California Unions for Reliable Energy (“CURE”) submits this prehearing conference statement.

1. CURE’s Proposed Witnesses and Testimony Topics

Each of CURE’s proposed witnesses and a summary of their testimony is discussed below. A copy of their qualifications is included as Attachment A. CURE reserves the right to present witnesses and testimony at any time up to and including the close of the evidentiary hearings.

A. David I. Marcus (*Time estimate for direct testimony: 30 min.*)

David Marcus will testify on the topics of transmission, interconnection, generation capacity, plant loads and efficiency.

B. Reservation of right to call Witness – CURE reserves the right to call a witness to testify in response to Ormat’s responses to Staff regarding generating capacity.

2. Topic Areas for Cross-Examination

CURE may require time to cross-examine each of Ormat’s and Staff’s witnesses. CURE requests and reserves the right to cross-examine witnesses in any of the topic areas at the evidentiary hearing.

3. CURE’s Proposed List of Exhibits

CURE provides its tentative list of exhibits in Attachment B and reserves the right to supplement this exhibit list with additional documents at any time up to and including the close of the evidentiary hearings.

4. Undisputed Facts

In the Verified Complaint and Request for Investigation, CURE alleged that on June 26, 2007, Ormat Nevada, Inc. (“Ormat”) filed a conditional use permit application with Imperial County to construct a 49.9 MW geothermal power plant located on the west side of the New River. (Compl., p. 6.) CURE also alleged that on August 8, 2008, Respondent filed a conditional use permit application with Imperial County to construct a 49.9 MW located on the east side of the New River. These facts are not in dispute. (Compl., p. 8; Answer, Appendix A, ¶¶ 7, 8.)

With the exception of the facts identified in the following paragraphs, Ormat does not admit or deny the remaining allegations of CURE’s Complaint.

5. Disputed Facts

The following facts are in dispute.

The North Brawley and East Brawley Projects are one Facility		
Whether Ormat is developing a 150 MW (gross) geothermal facility in the North Brawley Known Geothermal Resource Area.	Compl., p. 5.	Answer, Appendix A, ¶ 1.
Whether the North Brawley and East Brawley geothermal projects are one facility with a combined gross generating capacity of 150 MW.	Compl., p.	Answer, Appendix A, ¶ 2.
Whether Ormat may sell 50 MW of generation from the East Brawley project to Southern California Edison pursuant to the PPA agreement approved by CPUC Resolution E-4126.	Compl., pp. 2, 11.	Answer, Appendix A, ¶ 5.

Whether Ormat executed a PPA for the sale of up to 100 MW from a new geothermal facility in North Brawley.	Compl., p. 6.	Answer, pp. 4-5; <i>id.</i> Appendix A, ¶ 6.
Whether Ormat segmented permitting and development of the East Brawley and North Brawley facilities into two, 75 MW (gross) geothermal projects for the purpose of environmental review.	Compl., p.6.	Answer, Appendix A, ¶ 9.
Whether the East Brawley and North Brawley projects are proposed on adjoining parcels of land.	Compl., p. 9.	Answer, p. 6.
Whether East Brawley and North Brawley were planned separately or intended by Ormat as one development.	Compl. pp. 5-6.	Answer, pp. 6-8.
Whether East Brawley and North Brawley will share utility service pursuant to a water supply agreement between Ormat and the City of Brawley.	Compl. p. 20	Answer, pp. 8-9.
The Individual Net Generating Capacity of the North Brawley and East Brawley Projects		
Whether the net generating capacity of the East Brawley project is equal to or greater than 50 MW.	Compl. p.11.	Answer, pp. 3-4; Appendix A, ¶ 4.
Whether the net generating capacity of the North Brawley project is equal to or greater than 50 MW.	Compl. p. 11.	Answer, pp. 2-3; Appendix A, ¶ 3.

6. Briefing Deadlines and Scheduling Matters

This proceeding is not ready for an evidentiary hearing on September 26, 2011. Pursuant to Section 1234 of Title 20 of the California Code of Regulations, “[t]he hearing shall be scheduled to *commence* no sooner than 21 days after receipt of the answer and no later than 90 days after the receipt by the General Counsel of the complaint or request for investigation....The commission shall provide written notice...no fewer than

14 days before the *first hearing* on the matter.” (20 Cal. Code Reg. §1234(a)-(b) (emphasis added).) Because the Commission’s regulations only require the hearing to commence by a date certain, CURE recommends that the Committee continue the hearing until all parties are afforded an opportunity to exchange and review information and prepare informed testimony.

On September 9, 2011, CURE requested that the Committee extend the schedule in order to allow the parties to exchange and review information and prepare informed testimony. The basis for CURE’s request was that Ormat failed to serve documents on CURE making it difficult, if not impossible, for CURE to review and identify its exhibits and prepare testimony, if needed, by September 12th – the date upon which the Committee requested that the parties identify and serve exhibits.

On September 2, 2011, Ormat was required to respond to Terrence O’Brien’s August 15, 2011 data requests regarding the Commission’s jurisdiction over the Project. CURE expected Ormat to serve those responses on all parties. However, no documents were served on CURE on September 2nd. After the Labor Day holiday, on September 6, 2011, we inquired about Ormat’s responses and by the end of the day learned that, instead of docketing and serving written responses, Ormat met privately with Staff on September 2nd, submitted documents to Staff and docketed, but did not serve, an application for confidential designation of *some* of the

documents provided to Staff. To date, Ormat has not served *any* of the non-confidential responses or documents, nor has Ormat served its application for confidential designation of other documents. Instead, we received Ormat's application for confidential designation from Assistant Chief Counsel, Jeffrey M. Ogata.

On September 8, 2011, CURE contacted counsel for Ormat in an effort to expeditiously obtain the information Ormat provided to Staff. Counsel for Ormat did not return CURE's telephone calls. Therefore, on September 9th, 2011, CURE filed a Petition for Inspection and Copying of Records Provided by Ormat. In that Petition, CURE stated its willingness to treat Ormat's documents as confidential, explained that CURE is not a competitor or power plant developer to whom release of confidential information would place Ormat at a competitive disadvantage and proposed to enter into a standard nondisclosure with Ormat.

On September 8th and 9th, 2011, CURE requested information from Ormat related to the Project's water supply, transmission, road network and generating capacity. CURE requested that Ormat provide information by September 16, 2011.

Finally, the Committee ordered Staff to provide a written assessment of the Complaint and Answer by September 6, 2011. Staff filed an assessment that reviews the sufficiency of the Complaint and Answer, but that does not provide an assessment of the Project. Regarding Staff's

assessment of the Complaint, Staff indicated that CURE's Complaint provides all of the information required by Section 1231 of Title 20 of the California Code of Regulations, except for Ormat's phone number. Staff also questioned whether the "declaration under penalty of perjury" is properly signed by Elizabeth Klebaner, "attorney of record" for CURE when Section 1231(b)(8) of the regulations states that if a complainant is a corporation or business association, the complaint must be dated, signed and attested to by an officer thereof. Staff states that CURE's description that it is a coalition of labor unions does not answer the question as to whether CURE is a corporation or business association.

In response, CURE is willing to file an amended complaint that provides Ormat's phone number, if the Committee so directs. However, CURE is neither a corporation or business association. As set forth in the Complaint, CURE is a coalition of labor unions whose members help solve the State's energy problems by building, maintaining, and operating conventional and renewable energy power plants. CURE is committed to building a strong economy and a healthier environment. Individual members of the unions that comprise CURE and that are themselves members of CURE live, work, recreate, and raise their families in Imperial County, including the vicinity of the North Brawley and the East Brawley facilities and, therefore, would be first in line to be exposed to any hazardous materials, air contaminants, or other health and safety hazards from the Projects. As set forth CURE's

Petition for Confidential Records, CURE is concerned that under-examined and piecemealed environmental review could result in undisclosed impacts to air quality, public health, water resources and biological resources, among others, and from hazards and hazardous materials and may reduce the environmental carrying capacity of the state. In sum, since CURE is neither a corporation nor a business association, the Complaint need not be, and cannot be, dated, signed and attested to by an officer thereof.

With respect to Staff's assessment of the Project, Staff stated it was continuing to gather information from Ormat and would provide its assessment by September 12, 2011. Therefore, to date, Staff is the only party that has obtained information from Ormat, which is necessary to evaluate the Project's generation capacity, but has not yet provided the parties with an assessment of that information.

CURE proposes the following alternative proceeding schedules.

Proposed Schedule A:

September 12, 2011	Committee order all parties to docket and serve all documents on all parties Staff assessment provided to all parties
September 12, 2011	CURE and Ormat sign nondisclosure agreement and Ormat provide to CURE all documents previously provided to Staff
September 16, 2011	Ormat provide responses to CURE's request for information
September 26, 2011	Evidentiary hearing

October 3, 2011	Parties file opening briefs
October 7, 2011	Parties file reply briefs
October 17, 2011	Committee proposed decision (20 CCR 1235 requires the Committee to make a recommendation to the Commission within 21 days following the close of evidentiary hearings)

Proposed Schedule B:

September 19, 2011	Committee order all parties to docket and serve all documents on all parties Staff assessment provided to all parties
September 19, 2011	CURE and Ormat sign nondisclosure agreement and Ormat provide to CURE all documents previously provided to Staff
September 23, 2011	Ormat provide responses to CURE's request for information
September 26, 2011	First evidentiary hearing
October 3, 2011	Continued evidentiary hearing
October 10, 2011	Parties file opening briefs
October 14, 2011	Parties file reply briefs
October 24, 2011	Committee proposed decision (20 CCR 1235 requires the Committee to make a recommendation to the Commission within 21 days following the close of evidentiary hearings)

7. Comments on the Committee's Intention to Use Informal Hearing Procedures

At this time, CURE does not object to the use of informal hearing procedures. However, CURE reserves the right to object and request that the Committee convert any informal hearing into a formal hearing. CURE does object to the use of expert panels because this form of receiving evidence

typically results in a conversation which precludes effective cross examination of witnesses and results in confusion.

Dated: September 12, 2011 Respectfully submitted,

A handwritten signature in cursive script that reads "Tanya A. Gulesserian". The signature is written in black ink and is positioned above the typed name.

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DECLARATION OF SERVICE

In the Matter of Complaint Against Ormat Nevada, Inc. Brought By
California Unions for Reliable Energy

Docket No. 11-CAI-02

I, Valerie Stevenson, declare that on September 12, 2011, I served and filed copies of the attached **PREHEARING CONFERENCE STATEMENT OF CALIFORNIA UNIONS FOR RELIABLE ENERGY** dated September 12, 2011. The original document, filed with the Docket Office, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:

<http://www.energy.ca.gov/proceedings/11-cai-02/index.html>.

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(Check all that Apply)

For service to all other parties:

- √ Served electronically to all e-mail addresses on the Proof of Service list;
- √ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with firstclass postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email service preferred."

AND

For filing with the Docket Unit at the Energy Commission:

- √ by sending an original paper copy and one electronic copy, mailed with the U.S. Postal Service with first class postage thereon fully prepaid and e-mailed respectively, to the address below (preferred method);

OR

by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT

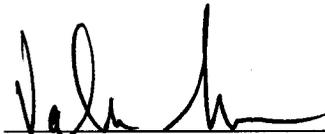
Attn: Docket No. 11-CAI-02
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

***OR, if filing a Petition for Reconsideration of Decision or Order
pursuant to Title 20, § 1720:***

Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
Sacramento, CA 95814
mlevy@energy.state.ca.us

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.



Valerie Stevenson



BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

**IN THE MATTER OF COMPLAINT AGAINST
ORMAT NEVADA, INC. BROUGHT BY
CALIFORNIA UNIONS FOR RELIABLE ENERGY**

**Docket No. 11-CAI-02
(Revised 9/12/11)**

RESPONDENT

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6225 Neil Road
Reno, NV 89511

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Ellison, Schneider and Harris, LLP
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INTERVENORS

*Imperial County Planning and
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Armando Villa,
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801 Main Street
El Centro, CA 92243-2811
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*Remy, Thomas, Moose &
Manley, LLP
Howard F. Wilkins
455 Capitol Mall, Suite 210
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**INTERESTED
AGENCIES/ENTITIES/PERSONS**

Imperial County Planning and
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801 Main Street
El Centro, CA 92243

Imperial County Air Pollution
Control District
150 South 9th Street
El Centro, CA 92243-2801

Imperial Irrigation District
333 E. Barioni Boulevard
Imperial, CA 92251

**ENERGY COMMISSION
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EXHIBIT A

STATE OF CALIFORNIA

California Energy Commission

In the Matter of Complaint Against

ORMAT NEVADA, INC. BROUGHT BY
CALIFORNIA UNIONS FOR
RELIABLE ENERGY

Docket No. 11-CAI-02

**CALIFORNIA UNIONS FOR RELIABLE ENERGY
TENTATIVE EXHIBIT LIST**

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Attorneys for the CALIFORNIA
UNIONS FOR RELIABLE ENERGY

Exhibit	Brief Description	Offered	Admitted
COMPLAINANT'S EXHIBITS			
1.	Verified Complaint and Request for Investigation By California Unions for Reliable Energy, dated June 28, 2011, docketed July 22, 2011		
2.	Verified Answer of Respondent Ormat Nevada, Inc., dated August 29, 2011, docketed August 29, 2011		
3.	Letter from Elizabeth Klebaner to Armando Villa and Sylvia Bermudez dated March 25, 2011, stamped received on March 28, 2011		
4.	Grant Deed, Loma Farms, Inc., dated July 3, 1984, and docketed on July 6, 1984		
5.	Application for Conditional Use Permit, Victor V. and Janet D. Veysey Trust, dated June 14, 2006		
6.	Letter from Charlene L. Wardlow to William S. Brunet, dated September 17, 2007		
7.	Letter from Jurg Heuberger to Charlene L. Wardlow, dated May 28, 2008, stamped received May 29, 2008		
8.	Letter from Johnny M. Romero to Jurg Heuberger, dated September 9, 2008, stamped received September 9, 2008		
9.	Letter from Carlton King to Jurg Heuberger, dated September 15, 2008		
10.	Letter from Manuel Ortiz to Jurg Heuberger, dated September 24, 2008, stamped received September 24, 2008		
11.	Letter from Fred Valera to Jurg Heuberger, dated October 22, 2008, stamped received October 23, 2008		
12.	Letter from Jurg Heuberger to Charlene Wardlow, dated October 30, 2008, stamped received November 3, 2008		
13.	Noise Impact Assessment submitted by Ormat Nevada Inc. to County of Imperial Planning & Development Services, dated December 4, 2008		

Exhibit	Brief Description	Offered	Admitted
14.	Letter from Manuel Ortiz to Bill Darnell, dated January 8, 2009		
15.	Letter from Joe Marhamati to Milford Wayne Donaldson, dated July 15, 2009		
16.	Memo from Development Deisgn & Engineering, Inc. (Contact: Derek Dessert) to Whom It May Concern, dated December 3, 2009		
17.	E-Mail from Jim Minnick to Jurg Heuberger, dated December 10, 2009		
18.	Project Report from Planning & Development Services Dept. to Environmental Evaluation Committee, dated December 10, 2009		
19.	Updated Project Description submitted by ORNI 19, LLC to County of Imperial Planning & Development Services, dated January 29, 2010		
20.	Letter from Alma Benavides to Janet Laurain, dated April 14, 2001		
21.	Memorandum of Understanding between the City of Brawley and Ormat Nevada, Inc., dated October 19, 2009		
22.	Ormat Wastewater Treatment Plant Tertiary Treatment Facility Conceptual Design Report with duplicate showing approximate date of February 14, 2011		
23.	Omitted		
24.	Comments on Brawley WWTP Tertiary Treatment Facility Conceptual Design Report, dated April 21, 2011		
25.	Letter from Vance Taylor to Janet Laurain, dated April 21, 2011		
26.	Facility Study Agreement between Imperial Irrigation District and Ormat Nevada Inc., dated January 4, 2008		
27.	First Amended and Restated Engineering and Procurement Agreement between Imperial Irrigation District and Ormat Nevada Inc., dated June 2, 2008		
28.	SB 610 – Water Supply Assessment prepared by Development Design & Engineering for Ormat Nevada, Inc., dated December 11, 2008		

Exhibit	Brief Description	Offered	Admitted
29.	North Brawley System Impact Study – Final Report, Revision 1, dated January 8, 2009		
30.	IID Interim Water Supply Policy for Non-Agricultural Projects, dated received April 22, 2011		
31.	Letter from Janet Laurain to Brad Poiriez, dated March 30, 2011		
32.	Letter from Charlene Wardlow to Jurg Heuberger, dated August 4, 2009		
33.	Letter from Charlene Wardlow to Jurg Heuberger, dated May 12, 2008		
34.	Letter from Ron Leiken to Brad Poirez dated September 14, 2010		
35.	Resolution Providing Direction to Staff from State Energy Resources Conservation and Development Commission, dated October 29, 1986		
36.	Letter from the California Energy Commission to Daniel Lyster, dated September 3, 1987, stamped received September 10, 1987		
37.	Environmental Impact Report Environmental Assessment prepared for the County of Mono energy Management Department and the Bureau of Land Management by ESA Planning and Environmental Services, dated October 1987		
38.	Waste Discharge Requirements (Revision 1) prepared by the California Regional Water Quality Control Board Colorado River Basin Region, dated January 16, 2008		
39.	Resolution E-4126 – Redacted prepared by the Public Utilities Commission of the State of California, dated March 13, 2008		
40.	Imperial Irrigation District Board Agenda Memorandum to Board of Directors from General Manager, dated October 7, 2008		
41.	Imperial Irrigation District Regular Meeting Agenda, dated October 7, 2008		
42.	E-Mail from Shahab Khoshmashrab to Ken Celli, dated August 8, 2011		

Exhibit	Brief Description	Offered	Admitted
43.	Nevada Geothermal Power: Project Status Report, dated May 11, 2011		
44.	<i>Ormat Technologies and Nevada Geothermal Power Execute EPC Contract for Blue Mountain Faulkner 1 Power Plant</i> , iStockAnalyst.com, dated April 2, 2008		
45.	<i>Top Plant: Blue Mountain Faulkner 1 Geothermal Power Plant, Humboldt County, Nevada</i> , by Angela Neville, JD, Powermag.com, dated December 1, 2010		
46.	Renewable Energy Update and Projects, Geothermal Projects, McIlvaine Company		
47.	County of Imperial East Brawley Geothermal Draft Environmental Impact Report, Volumes I and II, March 2011		

EXHIBIT B

RESUME

DAVID I. MARCUS
P.O. Box 1287
Berkeley, CA 94701-1287

January 2010

Employment

Self-employed, March 1981 - Present

Consultant on energy and electricity issues. Clients have included Imperial Irrigation District, the cities of Albuquerque and Boulder, the Rural Electrification Administration (REA), BPA, EPA, the Attorney Generals of California and New Mexico, alternative energy and cogeneration developers, environmental groups, labor unions, other energy consultants, and the Navajo Nation. Projects have included economic analyses of utility resource options and power contracts, utility restructuring, utility bankruptcy, nuclear power plants, non-utility cogeneration plants, and offshore oil and hydroelectric projects. Experienced user of production cost models to evaluate utility economics. Very familiar with western U.S. grid (WSCC) electric resources and transmission systems and their operation and economics. Have also performed EIS reviews, need analyses of proposed coal, gas and hydro powerplants, transmission lines, and coal mines. Have presented expert testimony before FERC, the California Energy Commission, the Public Utility Commissions of California, New Mexico, and Colorado, the Interstate Commerce Commission, and the U.S. Congress.

Environmental Defense Fund (EDF), October 1983 - April 1985

Economic analyst, employed half time at EDF's Berkeley, CA office. Analyzed nuclear power plant economics and coal plant sulfur emissions in New York state, using ELFIN model. Wrote critique of Federal coal leasing proposals for New Mexico and analysis of southwest U.S. markets for proposed New Mexico coal-fired power plants.

California Energy Commission (CEC), January 1980 - February 1981

Advisor to Commissioner. Wrote "California Electricity Needs," Chapter 1 of Electricity Tomorrow, part of the CEC's 1980 Biennial Report. Testified before California PUC and coauthored CEC staff brief on alternatives to the proposed 2500 megawatt Allen-Warner Valley coal project.

CEC, October 1977 - December 1979

Worked for CEC's Policy and Program Evaluation Office. Analyzed supply-side alternatives to the proposed Sundesert nuclear power plant and the proposed Point Concepcion LNG terminal. Was the CEC's technical expert in PG&E et. al. vs. CEC lawsuit, in which the U.S. Supreme Court ultimately upheld the CEC's authority to regulate nuclear powerplant siting.

Energy and Resources Group, U.C. Berkeley, Summer 1976

Developed a computer program to estimate the number of fatalities in the first month after a major meltdown accident at a nuclear power plant.

Federal Energy Agency (FEA), April- May 1976

Consultant on North Slope Crude. Where To? How?, a study by FEA's San Francisco office on the disposition of Alaskan oil.

Angeles Chapter, Sierra Club, September 1974 - August 1975

Reviewed EIRs and EISs. Chaired EIR Subcommittee of the Conservation Committee of the Angeles Chapter, January - August 1975.

Bechtel Power Corporation (BPC), June 1973 - April 1974

Planning and Scheduling Engineer at BPC's Norwalk, California office. Worked on construction planning for the Vogtle nuclear power plant (in Georgia).

Education

Energy and Resources Group, U.C. Berkeley, 1975 - 1977

M.A. in Energy and Resources. Two year master's degree program, with course work ranging from economics to engineering, law to public policy. Master's thesis on the causes of the 1972-77 boom in the price of yellowcake (uranium ore). Fully supported by scholarship from National Science Foundation.

University of California, San Diego, 1969 - 1973

B.A. in Mathematics. Graduated with honors. Junior year abroad at Trinity College, Dublin, Ireland.

Professional Publications

"Rate Making for Sales of Power to Public Utilities," with Michael D. Yokell, in Public Utilities Fortnightly, August 2, 1984.

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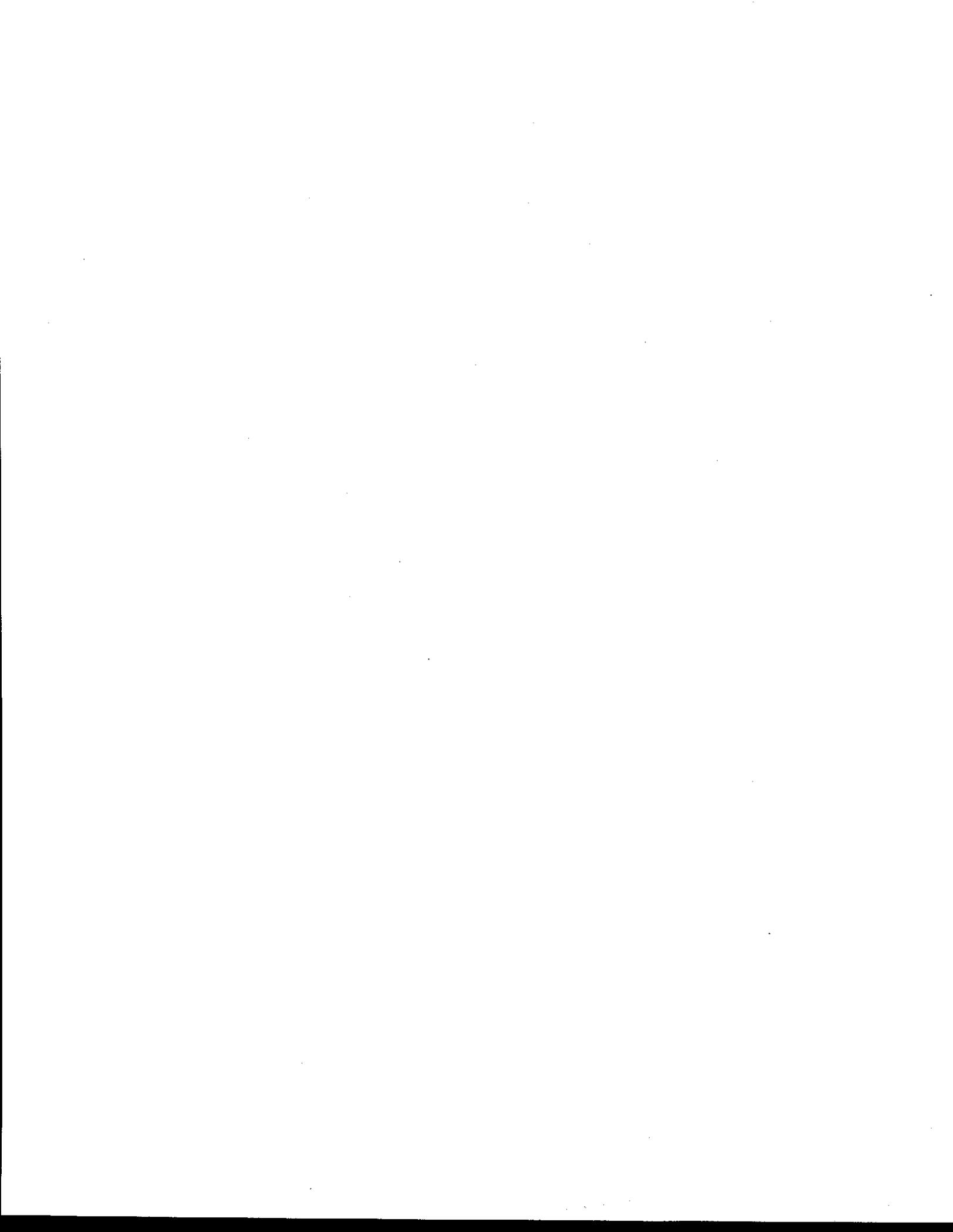
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23.	Omitted		
24.	Comments on Brawley WWTP Tertiary Treatment Facility Conceptual Design Report, dated April 21, 2011		
25.	Letter from Vance Taylor to Janet Laurain, dated April 21, 2011		
26.	Facility Study Agreement between Imperial Irrigation District and Ormat Nevada Inc., dated January 4, 2008		
27.	First Amended and Restated Engineering and Procurement Agreement between Imperial Irrigation District and Ormat Nevada Inc., dated June 2, 2008		
28.	SB 610 – Water Supply Assessment prepared by Development Design & Engineering for Ormat Nevada, Inc., dated December 11, 2008		

Exhibit	Brief Description	Offered	Admitted
29.	North Brawley System Impact Study – Final Report, Revision 1, dated January 8, 2009		
30.	IID Interim Water Supply Policy for Non-Agricultural Projects, dated received April 22, 2011		
31.	Letter from Janet Laurain to Brad Poiriez, dated March 30, 2011		
32.	Letter from Charlene Wardlow to Jurg Heuberger, dated August 4, 2009		
33.	Letter from Charlene Wardlow to Jurg Heuberger, dated May 12, 2008		
34.	Letter from Ron Leiken to Brad Poirez dated September 14, 2010		
35.	Resolution Providing Direction to Staff from State Energy Resources Conservation and Development Commission, dated October 29, 1986		
36.	Letter from the California Energy Commission to Daniel Lyster, dated September 3, 1987, stamped received September 10, 1987		
37.	Environmental Impact Report Environmental Assessment prepared for the County of Mono energy Management Department and the Bureau of Land Management by ESA Planning and Environmental Services, dated October 1987		
38.	Waste Discharge Requirements (Revision 1) prepared by the California Regional Water Quality Control Board Colorado River Basin Region, dated January 16, 2008		
39.	Resolution E-4126 – Redacted prepared by the Public Utilities Commission of the State of California, dated March 13, 2008		
40.	Imperial Irrigation District Board Agenda Memorandum to Board of Directors from General Manager, dated October 7, 2008		
41.	Imperial Irrigation District Regular Meeting Agenda, dated October 7, 2008		
42.	E-Mail from Shahab Khoshmashrab to Ken Celli, dated August 8, 2011		

Exhibit	Brief Description	Offered	Admitted
43.	Nevada Geothermal Power: Project Status Report, dated May 11, 2011		
44.	<i>Ormat Technologies and Nevada Geothermal Power Execute EPC Contract for Blue Mountain Faulkner 1 Power Plant</i> , iStockAnalyst.com, dated April 2, 2008		
45.	<i>Top Plant: Blue Mountain Faulkner 1 Geothermal Power Plant, Humboldt County, Nevada</i> , by Angela Neville, JD, Powermag.com, dated December 1, 2010		
46.	Renewable Energy Update and Projects, Geothermal Projects, McIlvaine Company		
47.	County of Imperial East Brawley Geothermal Draft Environmental Impact Report, Volumes I and II, March 2011		

EXHIBIT 1

EXHIBIT 1



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June 28, 2011

Michael J. Levy
Office of Chief Counsel
California Energy Commission
1516 Ninth Street, MS-14
Sacramento, CA 95814

Re: CURE'S VERIFIED COMPLAINT AND REQUEST FOR
INVESTIGATION

Dear Mr. Levy:

Pursuant to California Code of Regulations, Title 20, section 1231, enclosed please find a Verified Complaint and Request for Investigation by California Unions for Reliable Energy.

Sincerely,



Valerie A. Stevenson
Assistant to Elizabeth Klebaner

Enclosure

:vs

2328-024v



STATE OF CALIFORNIA

**Energy Resources Conservation
and Development Commission**

In the Matter of:

Investigation of Possible Energy
Commission Power Facility Siting
Jurisdiction Over Two 49.9 MW
Geothermal Units Known as the East
Brawley and the North Brawley
Geothermal Developments

Complaint No.

VERIFIED COMPLAINT AND REQUEST FOR INVESTIGATION

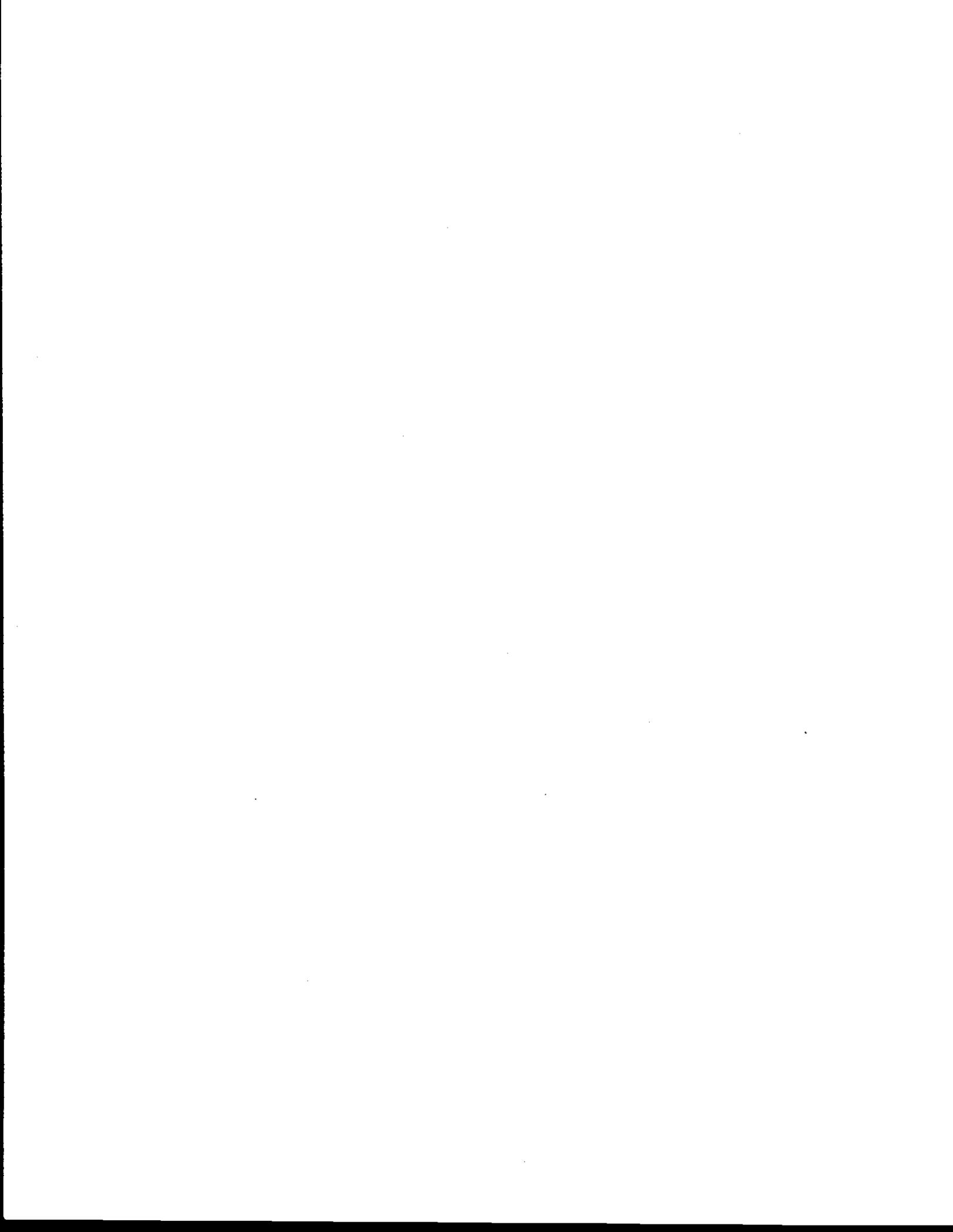
BY

CALIFORNIA UNIONS FOR RELIABLE ENERGY

June 28, 2011

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Attorneys for California Unions of
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VERIFIED COMPLAINT AND REQUEST FOR INVESTIGATION

Pursuant to section 1231 of Title 20 of the California Code of Regulations, California Unions for Reliable Energy (“CURE”) files this Verified Complaint and Request for Investigation (“Complaint”) against Ormat Nevada Inc., (“Ormat”) for violating Public Resources Code section 25500 and the Commission’s implementing regulations.¹ CURE concurrently and in the alternative requests the California Energy Commission (“Commission”) initiate the investigation proceedings that are necessary to adjudicate this Complaint.²

INTRODUCTION

Ormat violated section 25500 of the Warren-Alquist Act by circumventing the Commission’s jurisdiction with regard to the licensing of a 150 megawatt (“MW”) facility within the North Brawley Known Geothermal Resource Area in Imperial County. Ormat’s proposed geothermal complex will occupy approximately 5,000 acres of agricultural lands along the east and west banks of the New River, one mile north of the City of Brawley, and comprises Ormat’s existing North Brawley Geothermal Development (“North Brawley”) and Ormat’s proposed East Brawley Geothermal Development (“East Brawley”). Ormat claims that North Brawley and East Brawley are

¹ In this Complaint, “Ormat” refers to Ormat Nevada Inc. and its subsidiaries.

² Section 1231 authorizes “any person” to file a complaint alleging a violation of a statute, regulation, order, program, or decision adopted, administered, or enforced by the CEC. Pursuant to 1231, a single proceeding may involve both a complaint and an investigation.

distinct facilities, each including a 49.9 MW power plant and associated well field.

Ormat's claims are directly contradicted by a California Public Utilities Commission ("CPUC") resolution approving a power purchase agreement ("PPA") between Southern California Edison Company ("SCE") and Ormat. Pursuant to the CPUC resolution, attached as Exhibit C, SCE is authorized to purchase 50 MW, and up to 100 MW, of generation from Ormat's geothermal facility in North Brawley, California. Ormat has indicated that it intends to sell 50 MW from the North Brawley facility, and may sell an additional 50 MW from the East Brawley facility, to SCE pursuant to the terms of the PPA. The CPUC resolution approving the PPA together with Ormat's representations provide a reasonable basis to conclude that both the North Brawley facility and the East Brawley facility meet the Commission's 50 MW jurisdictional threshold and are both subject to the Commission's licensing authority.

In the alternative, the Commission must assume jurisdiction over North Brawley and East Brawley because it is one facility with a combined generating capacity of 150 MW. Together, North Brawley and East Brawley

proposed on adjoining parcels, which are leased or owned by Ormat. As such, their energy and environmental impacts are that of a single facility for the purpose of the Warren-Alquist State Energy Resources Conservation & Development Act ("Warren-Alquist Act").

The Commission must take immediate action to enjoin the ongoing licensing and construction of North Brawley and East Brawley, initiate an investigation of Ormat's violations of section 25500 of the Warren-Alquist Act, and seek all appropriate remedies against Ormat for any willful violations of the Act.

**INFORMATION REQUIRED BY CALIFORNIA CODE OF
REGULATIONS TITLE 20, SECTION 1231**

I. Name and Address of Complainant

CALIFORNIA UNIONS FOR RELIABLE ENERGY
c/o Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080
Tel: (650) 589-1660

CURE is a coalition of labor unions whose members help solve the State's energy problems by building, maintaining, and operating conventional and renewable energy power plants. CURE is committed to building a strong economy and a healthier environment. Since its founding in 1997, CURE has helped cut smog-forming pollutants in half, reduced toxic emissions, increased the use of recycled water for cooling systems and pushed for groundbreaking pollution control equipment as the standard for all new power plants. CURE has also successfully advocated for the use of low

impact development techniques, dry cooling technology, and enforceable and effective compensatory mitigation for impacts to sensitive biological resources in the siting and licensing of renewable energy projects throughout California, all while ensuring new power plants are built with highly trained, professional workers who live and raise families in nearby communities.

Individual members of the unions that comprise CURE live, work, recreate, and raise their families in Imperial County, including the vicinity of the North Brawley and the East Brawley facilities. Accordingly, they would be directly affected by the facilities' environmental and health and safety impacts. Individual members of the unions that comprise CURE may also work on the North Brawley and the East Brawley facilities. They will, therefore, be first in line to be exposed to any hazardous materials, air contaminants, or other health and safety hazards that exist on site.

In addition, CURE has an interest in enforcing environmental laws that encourage sustainable development and ensure a safe working environment for its members. Environmentally detrimental projects jeopardize future jobs by making it more difficult and more expensive for business and industry to expand in the region. Additionally, continued degradation can, and has, caused construction moratoriums and other restrictions on growth which, in turn, reduce future employment opportunities.

II. Name and Address of Respondent

Ormat Nevada Inc.
980 Greg Street
Sparks, NV 89431-6039

Ormat is headquartered in Sparks, Nevada. Ormat designs, develops, builds, owns, operates, and supplies geothermal power plants in Nevada and California. Ormat is the parent company of ORNI 18, LLC, the conditional use permit holder for the construction and operation of the North Brawley facility, and ORNI 17, LLC, the applicant for a conditional use permit to construct and operate the East Brawley facility.

Ormat is a subsidiary of Ormat Technologies, Inc. (“OTI”), a publicly traded company which owns and operates geothermal facilities within and outside of the United States. OTI is the developer and owner of the 92 MW Heber geothermal complex in Imperial County and the 114 MW Ormesa geothermal complex, also located in Imperial County.

III. Statement of Facts

In 2007, Ormat commenced developing a 150 MW geothermal facility in the North Brawley Known Geothermal Area by entering into a Facility Study Agreement with the Imperial Irrigation District (“IID”)³ and a PPA with SCE for the sale of up to 100 MW of generation from a new geothermal

³ See Imperial Irrigation District, North Brawley System Impact Study, (revised) January 8, 2009, p. 1 (analyzing “the proposed North Brawley 150 MW generation project”) (an excerpt of the study is attached as Exhibit A); see also Facility Study Agreement between Imperial Irrigation District and Ormat Nevada Inc., North Brawley Geothermal Project (attached as Exhibit B).

facility in North Brawley, California.⁴ On March 13, 2008, the CPUC authorized SCE to procure up to 100 MW from Ormat pursuant to the PPA through Resolution E-4126 on March 13, 2008.⁵ However, for the purpose of environmental review, Ormat segmented the 150 MW facility into two geothermal development projects, each with a gross generating capacity of 75 MW.^{6 7} Ormat proceeded to file sequential conditional use permit applications with the County to obtain authorization to construct and develop the North Brawley and East Brawley power plants and their associated well fields.

A. The North Brawley Conditional Use Permit Application

On June 26, 2007, Ormat filed a conditional use permit application with the County to construct the North Brawley facility. According to Ormat's application, the North Brawley facility comprised: a 49.9 net MW, wet-cooled, binary plant with six Ormat Energy Converters ("OEC"); a geothermal well field of 20-26 production wells and 14-20 injection wells and interconnecting brine and water pipelines; and a gen tie transmission line, connecting the facility to IID's system through a new substation, owned by Ormat.

⁴ See Energy Division, California Public Utilities Commission Redacted Resolution E-4126, March 13, 2008, pp. 1, 8, 16 ("Resolution E-4126") (attached as Exhibit C).

⁵ Exhibit C, p. 16.

⁶ According to IID's system interconnection study, each facility's load is 25 MW.

⁷ See Imperial County Planning & Development Services, Draft Environmental Impact Report for the East Brawley Geothermal Project ("DEIR"), March 2011, Appendix D, p. 11, available at <http://www.icpds.com/?pid=2666> (last visited May 20, 2011); see also Revised Application for Authority to Construct for the East Brawley Geothermal Development Project, September 14, 2010 ("2010 Revised ATC Application") (attached as Exhibit D).

Ormat proposed to site the North Brawley power plant at 4982 Hovley Road in Imperial County, approximately one mile north of the City of Brawley on a parcel owned by Ormat. The North Brawley well field would be located within approximately 1,800 acres of agricultural lands, leased by Ormat, abutting the west bank of the New River.⁸

On October 11, 2007, the County made available for public review a Mitigated Negative Declaration (“MND”) for the North Brawley project, pursuant to the California Environmental Quality Act (“CEQA”).⁹

On December 28, 2007, the County adopted the MND and granted Ormat a conditional use permit to construct and operate the North Brawley facility.

B. The Expansion of the North Brawley Well Field

On May 12, 2008, Ormat submitted a Request for Minor Amendment to the County, for authorization to expand the North Brawley well field northward and to the west bank of the New River.¹⁰

According to Ormat, the amendment was necessary to encompass lands that had been secured by Ormat through new lease agreements with surrounding landholders.¹¹

⁸ Conditional Use Permit Application, pp. 6, 20-21.

⁹ Pub. Resources Code §§ 21000 et seq.

¹⁰ Letter from Charlene L. Wardlow, Environmental/Regulatory Affairs Administrator, ORMAT, to Mr. Jurg Heuberger, Planning Director, Imperial County Planning & Development Services regarding CUP#07-0017 Request for Amendment, March 12, 2008 (attached as Exhibit E).

¹¹ *Id.*

On May 28, 2008, the County approved Ormat's Request for Minor Amendment without further environmental review.¹² Ormat constructed the North Brawley facility; however, the facility's commercial operation was delayed due to engineering problems.¹³

C. The East Brawley Conditional Use Permit Application

On August, 8, 2008, approximately two months after the County approved Ormat's Request for Minor Amendment to the North Brawley conditional use permit, Ormat filed a conditional use permit application with the County to construct the East Brawley facility.

The East Brawley project proposal is virtually identical to the North Brawley facility. According to Ormat, East Brawley comprises: a 49.9 net MW binary, wet-cooled geothermal power plant; a well field of up to 30 production and 30 injection wells and associated brine and water pipeline network; and a 2-mile gen tie transmission line spanning the New River to connect to IID's system through Ormat's North Brawley substation.

Ormat proposes to site the East Brawley power plant approximately three miles north the City of Brawley and east of the New River, on a parcel owned by Ormat. The East Brawley well field would be located within approximately 3,000 acres of agricultural lands abutting the east bank of the

¹² Letter from Jurg Heuberger, Director Imperial County Planning & Development Services to Charlene Wardlow, Environmental Regulatory Affairs Administrator, Request for Minor Amendment to CUP No. 07-0017, May 28, 2008 (attached as Exhibit F).

¹³ A high amount of undissolved solids in the geothermal fluid limited the plant's generating capacity. Think GeoEnergy, *Ormat's North Brawley plant with 17 MW short of its 50 MW potential*, February 10, 2010 (attached as Exhibit G).

New River. As with the North Brawley facility, the parcels underlying the well field are leased by Ormat.¹⁴

On October 30, 2007, the County placed Ormat's application on hold because Ormat was unable to timely secure a water source to meet East Brawley's construction and operational water demands.¹⁵

D. The Expansion of the East Brawley Well Field

On August 4, 2009, Ormat submitted a revised conditional use permit application, proposing to expand the East Brawley well field in a westerly direction and across the New River. The expanded well field would occupy areas previously leased by Ormat for the North Brawley well field. Wells on either side of the New River would be connected by geothermal brine lines, noncondensable gas lines, and power and control cables, routed across the New River.

E. Water Supply Infrastructure for the East Brawley and North Brawley Facilities

On January 29, 2010, Ormat revised the East Brawley project proposal by reducing the proposed well field to 34 wells (half injection, half production).¹⁶ Ormat also proposed to finance the construction of water supply infrastructure which would deliver cooling water to both the East Brawley and North Brawley facilities.

¹⁴ A map of the East Brawley and North Brawley projects is attached as Exhibit H.

¹⁵ Letter from Jurg Heurberger, Planning & Development Services Director, County of Imperial to Charlene L. Warldlow, Director of Project Development, Ormat Nevada Inc., regarding Conditional Use Permit #08-0023 (East Brawley Facility) APN: 037-140-006-000, October 30, 2008 (attached as Exhibit I).

According to the updated conditional use permit application for the East Brawley facility, Ormat proposed to finance the construction and maintenance of a tertiary treatment system for the City of Brawley's Wastewater Treatment Plant ("BWWTP") in exchange for 100 percent of the City's daily effluent outflow for the life of the East Brawley facility. Ormat's construction of the tertiary treatment system cannot commence until the City completes the ongoing secondary treatment system upgrades to the BWWTP.¹⁷ According to the updated conditional use permit application, treated wastewater from the BWWTP would supply the majority of the East Brawley facility's operational water demand. Treated effluent from the BWWTP would also supply the North Brawley facility.¹⁸

In the updated conditional use permit application, Ormat indicated that during peak heat conditions the East Brawley facility could rely on cooling water blowdown from the North Brawley facility for power plant cooling.¹⁹

On March 16, 2011, the County published a Notice of Availability of the Draft Environmental Impact Report ("DEIR") for the East Brawley conditional use permit in accordance with CEQA. In the DEIR, the County concluded that a project alternative which relies on reclaimed water from the

¹⁶ East Brawley Geothermal Development Project, Updated Project Description, January 29, 2010 (attached as Exhibit J).

¹⁷ See Ormat, Brawley Wastewater Treatment Facility Conceptual Design Report (attached as Exhibit K).

¹⁸ *Id.*, p. 1.

¹⁹ See DEIR, p. 6.0-8.

BWWTP and cooling tower blowdown from the North Brawley facility (as well as from the on-site cooling towers) was the environmentally preferred project alternative for the East Brawley facility. The public comment period on the DEIR closed on May 10, 2011.

F. The Net Generating Capacity of the East Brawley and North Brawley Power Plants

The net generating capacity of the East Brawley and North Brawley power plants cannot be conclusively determined based on publicly available information. Neither the County, nor Ormat have provided supporting documentation verifying Ormat's generating capacity calculations of 49.9 MW each for the North Brawley and East Brawley facilities. However, CPUC Resolution E-4126 and Ormat's representations to the County show that the generating capacity of the North Brawley and East Brawley power plants each exceeds 49.9 MW.

In particular, Ormat stated that it entered into a PPA with SCE, pursuant to which Ormat is obligated to deliver 50 MW of generation from the North Brawley power plant to SCE's system with an option to increase sales to 100 MW of generation.²⁰ The CPUC has authorized SCE to procure up to 100 MW of generation from Ormat's North Brawley geothermal facility. Ormat indicated that it may exercise the option to increase sales to 100 MW once the East Brawley facility comes online.²¹

²⁰ East Brawley Geothermal Development Project, Updated Project Description, January 29, 2010, p. 28.

²¹ *Id.*

IV. Statutes, Regulations, and Decision Upon Which Complaint Is Based

A. Warren-Alquist Act (Pub. Resources Code § 25110)

Public Resources Code section 25110 provides:

“Facility” means any electric transmission line or thermal powerplant, or both electric transmission line and thermal powerplant, regulated according to the provisions of this division.

B. Warren-Alquist Act (Pub. Resources Code § 25120)

Public Resources Code section 25120 provides:

“Thermal powerplant” means any stationary or floating electrical generating facility using any source of thermal energy, with a generating capacity of 50 megawatts or more, and any facilities appurtenant thereto

C. Warren-Alquist Act (Pub. Resources Code § 25500)

Public Resources Code Section 25500 provides:

In accordance with the provisions of this division, the commission shall have the exclusive power to certify all sites and related facilities in the state, whether a new site and related facility or a change or addition to an existing facility. . . . [N]o construction of any facility or modification of any existing facility shall be commenced without first obtaining certification for any such site and related facility by the commission, as prescribed in this division.

D. California Code of Regulations, Title 20, Section 2003 subd.(a)

Section 2003(a) of Title 20 of the California Code of Regulations

provides:

The “generating capacity” of an electric generating facility means the maximum gross rating of the plant’s turbine generator(s), in megawatts (“MW”), minus the minimum auxiliary load.

E. California Code of Regulations, Title 20, Section 2003
subd. (b)(1)

Section 2003(b)(1) of Title 20 of the California Code of Regulations provides:

The "maximum gross rating" of the plant's turbine generator(s) shall be determined according to this subdivision. If there is more than one turbine generator, the maximum gross rating of all turbine generators shall be added together to determine the total maximum gross rating of the plant's turbine generator(s).

The maximum gross rating of a steam turbine generator shall be the output, in MW, of the turbine generator at those steam conditions and at those extraction and induction conditions which yield the highest generating capacity on a continuous basis.

F. California Code of Regulations, Title 20, Section 2003
subd. (b)(3)

Section 2003(b)(3) of Title 20 of the California Code of Regulations provides:

The maximum gross rating cannot be limited by an operator's discretion to lower the output of the turbine generator(s) or by temporary design modifications that have no function other than to limit a turbine generator's output.

G. California Code of Regulations, Title 20, Section 2003
subd. (b)(4)

Section 2003(b)(4) of Title 20 of the California Code of Regulations provides:

The maximum gross ratings specified in the overall plant heat and mass balance calculations shall be subject to verification by commission review of the steam or combustion turbine generator manufacturer's performance guarantee, specifications and procurement contract, if available.

H. California Code of Regulations, Title 20, Section 2003 subd. (c)
(Cal. Code Regs., tit. 20, § 2003)

Section 2003(c) of Title 20 of the California Code of Regulations
provides:

The "minimum auxiliary load" means the electrical rating (in MW) of the sum of the minimum continuous and the average intermittent on-site electrical power requirements necessary to support the maximum gross rating as defined in subsection (b) of this regulation and which are supplied directly by the power plant. For geothermal projects, the minimum auxiliary load includes the minimum electrical operating requirements for the associated geothermal field which are necessary for and supplied directly by the power plant. Discretionary loads, i.e., those which can be curtailed without precluding power generation, are not included in minimum auxiliary loads.

I. California Energy Commission Resolution Providing Direction to Staff, In the Matter of Staff Investigation of Possible Energy Commission Power Facility Siting Jurisdiction over Five 30 Megawatt Units Known as Luz SEGS Units III-VII ("Luz SEGS Decision")

In the Luz SEGS Decision, dated October 29, 1986, the Commission
determined that:

[I]n order for its jurisdiction over generation facilities to be equitably administered, the Commission must assert its jurisdiction in an even-handed fashion when it appears that there is a reasonable basis for doing so.

(Luz SEGS Decision, p. 1.)

In that proceeding, the Commission determined that a reasonable basis exists to conclude that separately proposed thermal power plants, each with a generating capacity less than 50 MW, should be aggregated and deemed one facility for the purpose of the Warren-Alquist Act where the power plants are installed, owned and operated by the same entity, are

proposed for contiguous parcels of land, and where “the energy and environmental impact” of the power plants is that of one facility. (*Id.* at pp. 1-2, 4.)

V. DISCUSSION

Ormat violated section 25500 of the Warren-Alquist Act by circumventing the Commission’s licensing authority with regard to the permitting of the North Brawley and East Brawley facilities. Ormat conceived of the North Brawley and East Brawley facilities, representing 150 MW of gross generation, as early as 2007. Subsequently, Ormat filed multiple permit applications with the County to obtain approvals for the incremental expansion and reconfiguration of the North Brawley and East Brawley facilities, which today represent one, indivisible, 150 MW geothermal facility. Ormat has separately contracted for the sale of 50 MW of generation from the North Brawley facility with the option to increase sales to 100 MW with generation from the East Brawley facility.

The Commission must immediately commence a jurisdictional investigation regarding the North Brawley and East Brawley facilities and find, based upon this Complaint and any further investigation undertaken by Staff, that the facilities are individually and collectively subject to the Commission’s jurisdiction. Further, in order to implement the Warren-Alquist Act in an even-handed and equitable fashion, the Commission must, pursuant to Public Resources Code section 25900, request the Attorney General to petition for an injunction to halt the construction of the proposed

East Brawley facility, as well as any ongoing expansions of the existing North Brawley facility, until Ormat obtains an appropriate certification to proceed from the Commission.

A. Ormat Violated Section 25500 of the Warren-Alquist Act By Failing to Submit to the Commission's Exclusive Jurisdiction to License the North Brawley Facility and East Brawley Facility

Pursuant to the Warren-Alquist Act, the Commission has power to certify all sites and related facilities in California for thermal power plants with a net generating capacity of 50 MW or greater. (Pub. Resources Code §§ 25500, 25120.) The Commission's authority is exclusive:

The issuance of a certificate by the commission shall be in lieu of any permit, certificate, or similar document required by any state, local or regional agency, or federal agency to the extent permitted by federal law, for such use of the site and related facilities, and shall supersede any applicable statute, ordinance, or regulation of any state, local, or regional agency, or federal agency to the extent permitted by federal law.

After the effective date of this division, *no construction of any facility or modification of any existing facility* shall be commenced without first obtaining certification for any such site and related facility by the commission, as prescribed in this division.

(Pub. Resources Code § 25500 (emphasis added).)

The Commission promulgated regulations which determine whether a proposed thermal power plant is subject to the Commission's jurisdiction.

(See generally, Cal. Code Regs., tit. 20, § 2003.) According to the Commission's regulations, the "generating capacity" of an electric generating facility is the maximum gross rating of the plant's turbine generator(s), in

MW minus the plant's minimum auxiliary load. (Cal. Code Regs., tit. 20, § 2003 subd. (a).)

The "maximum gross rating" of the plant's turbine generator refers to the output of a turbine generator at those steam conditions which yield the highest generating capacity on a continuous basis. (Cal. Code Regs., tit., 20 § 2003 subd. (b)(1).) The plant's minimum auxiliary load, also referred to as the plant's parasitic load, is defined as the electrical rating in MW of the sum of the minimum continuous and the average intermittent on-site electrical power requirements necessary to support the maximum gross rating and which are supplied directly by the power plant. (Cal. Code Regs., tit. 20, § 2003 subd. (c).) For geothermal projects, the minimum auxiliary load includes the minimum electrical operating requirements for the associated geothermal field which are necessary for and supplied directly by the power plant. (*Id.*)

The North Brawley and East Brawley facilities are each individually subject to the Commission's licensing authority pursuant to section 25500 of the Warren-Alquist Act because they are thermal power plants, each with a generating capacity equal to or in excess of 50 MW. In a conditional use permit application for the East Brawley facility, Ormat states that it has entered into a PPA with SCE for the sale of 50 MW of generation from the North Brawley facility. Pursuant to the terms of the same PPA, Ormat may exercise an option to increase sales to SCE to 100 MW with 50 MW of

generation from the proposed East Brawley facility. The CPUC approved the PPA, authorizing SCE to procure up to 100 MW of generation from Ormat's geothermal facilities.

The CPUC Resolution and Ormat's representations regarding its intent to sell generation from East Brawley to SCE provide a reasonable basis to conclude that, contrary to Ormat's claims, the generating capacity of the North Brawley and East Brawley facilities meet the Commission's 50 MW jurisdictional threshold. The 50 MW of generation, which Ormat is contractually obligated to sell to SCE from North Brawley – and the additional 50 MW of generation it intends to sell to SCE from East Brawley – is the difference between the facilities' maximum gross rating and minimum auxiliary load. (See Cal. Code Regs. § 2003 subd. (a)-(c).) Accordingly, North Brawley and East Brawley are each subject to the Commission's jurisdiction. (Pub. Resources Code §§ 25500, 25120.)

To assist the Commission in reaching a jurisdictional determination with regard to the North Brawley and East Brawley facilities, the Commission must order Ormat to produce all relevant information, including its PPA with SCE. (Pub. Resources Code § 25210; *see also* Cal. Code Regs., tit. 20, §§ 2003 subd. (a)-(c).) The Commission must then immediately assume licensing jurisdiction over the North Brawley and East Brawley facilities.

B. Ormat Violated Section 25500 of the Warren-Alquist Act By Failing to Submit to the Commission's Jurisdiction to License a 100 MW Geothermal Facility

Whether or not each of the facilities has an individual generating capacity of 50 MW, the East Brawley and North Brawley facilities are one facility with a net generating capacity of 100 MW, within the meaning of the Warren-Alquist Act. Accordingly, the Commission should find that Ormat violated the Warren-Alquist Act and immediately assume jurisdiction over the County's ongoing licensing proceedings. In the Luz SEGS Decision, attached as Exhibit L, the Commission determined that the generating capacities of separately proposed power plants, the energy and environmental impacts of which may be deemed to be that of one facility, should be aggregated for the purpose of a jurisdictional determination under the Warren-Alquist Act. (Luz SEGS Decision, pp. 1-2, 4.)

In that proceeding, the Commission concluded that the five, 30 MW Luz SEGS units were one "facility" for the purpose of the Warren-Alquist Act because they were designed, owned and controlled by one entity, and were sited on contiguous parcels of land. (*See* Pub. Resources Code § 25120; *see also* Luz SEGS Decision, pp. 1-2; *id.* at Appendix A, pp. 3-4.) The facts of this case are the same as the Luz SEGS Units III-VII proceeding.

North Brawley and East Brawley were conceived simultaneously by Ormat as early as 2007. North Brawley and East Brawley will be owned and operated by Ormat, are virtually identical, and are proposed on adjoining parcels of land, also owned or leased by Ormat. As in the Luz SEGS

Units III-VII proceeding, the element of shared ownership and control is plainly satisfied here.

North Brawley and East Brawley also exhibit the elements of physical interconnectedness found to be determinative by the Commission in the case of the Luz SEGS units. (*See generally*, Luz SEGS Decision, Appendix A.) Both facilities will interconnect to the electrical grid through one substation, which is owned and operated by Ormat and which is located on land also owned or leased by Ormat. North Brawley and East Brawley will also share utility service pursuant to a water supply agreement between Ormat and the City of Brawley for 100 percent of the daily effluent (once available) from the BWWTP. The infrastructure that will convey treated wastewater from the BWWTP to the North Brawley and East Brawley facilities, as well as the necessary tertiary treatment system upgrades to the BWWTP, will be funded and constructed by Ormat. Additionally, the North Brawley and East Brawley power plants will be physically joined to facilitate cooling water blowdown delivery from the North Brawley facility to the East Brawley facility to help meet East Brawley's peak water demand in the summer months. Finally, and based upon the engineering descriptions included in Ormat's sequential conditional use permit applications to the County, the well fields associated with each facility will be physically interconnected through cables and brine and cooling water pipelines spanning the New River. In sum, the North Brawley and East Brawley facilities are one

geothermal facility with a generating capacity of 100 MW. The Commission should immediately assume jurisdiction of the East Brawley project, and evaluate the combined environmental impacts of North Brawley and East Brawley as one, 100 MW geothermal facility.

C. Ormat's Violations of the Warren-Alquist Act

In the Luz SEGS Decision, the Commission determined that it had no evidence to conclude that Luz had intentionally sought to circumvent the requirements of the Warren-Alquist Act. (*Id.* at p.3; *id.* at p. 3 fn.2.) This finding and the viability of the Luz SEGS units supported the Commission's exercise of prosecutorial discretion with respect to Luz's violations of the Warren-Alquist Act. (*Id.* at pp. 2-4.) The Commission cannot reach the same conclusion in this case. The Commission's policies encouraging renewable generation development counsel for the forceful assertion of its jurisdiction in this case.

Ormat is an experienced developer and owner of geothermal facilities, which has sited and operates numerous geothermal facilities within California. Ormat avoided Commission jurisdiction through its practice of incrementally permitting and constructing the North Brawley and East Brawley facilities to develop one, interconnected geothermal complex, all while executing a PPA for the sale of up to 100 MW of generation from the North Brawley and East Brawley facilities. Although Ormat has devoted more than three years to developing the combined facilities, it never sought to obtain a jurisdictional determination from the Commission. Any one of

these factors is enough to raise significant doubt regarding Ormat's good faith ignorance of the Commission's licensing authority. However, all of these factors combined strongly suggest that Ormat willfully evaded the Commission's jurisdiction. Accordingly, the Commission should investigate and pursue all available remedies against Ormat for any willful violations of the Act.

Finally, the policy considerations that warranted the Commission's exercise of prosecutorial discretion with respect to Luz demand the opposite result in this case. In light of the finite water supplies in Imperial County and the limited carrying capacity of the State's resources in general, it is imperative that the Commission promote the development of viable renewable energy projects. Accordingly, the Commission must assume an active role, consistent with its mandate under the Warren-Alquist Act, in the certification of the States' growing inventory of renewable generation. This case is an opportunity for the Commission to affirm its commitment to implement the Act in a just and even-handed fashion.

VI. Requested Action

CURE requests the Commission do the following:

1. In accordance with Public Resources Code Section 25210, immediately commence an investigation of Ormat for the purpose of a jurisdictional determination regarding the North Brawley and East Brawley facilities.

2. In accordance with Public Resources Code section 25210, immediately commence an investigation to determine the nature and extent of any violations by Ormat.

3. In accordance with Public Resources Code section 25210, request the Attorney General to petition for an injunction of any ongoing licensing and construction activities relating to the North Brawley and East Brawley facilities.

4. Find that North Brawley and East Brawley are individually and collectively subject to the Commission's licensing jurisdiction under the Warren-Alquist Act.

5. Take any other action necessary and appropriate under the Commission's statutory and regulatory authority to assume licensing jurisdiction of the North Brawley and East Brawley projects.

6. Take any other action necessary and appropriate under the Commission's statutory and regulatory authority to prevent any further violation by Ormat and to remedy any and all adverse impacts to the public health, safety, and welfare, and the environment, resulting from the violation.

7. In accordance with section 1232, Title 20 of the California Code of Regulations, serve a copy of this complaint on Ormat, provide notice of this Complaint and future investigatory proceedings to petitioners, respondents, and all entities identified in this Complaint, schedule any necessary

hearings, and take additional steps to notify other individuals, organization, and businesses which the committee or the chairman has reason to believe would be adversely affected by a decision.

VII. Authority for Requested Action

In addition to its plenary jurisdiction to certify sites for thermal power plants 50 MW or greater, the Commission has broad authority to take action in response to this Complaint.

First, Public Resources Code section 25210 empowers the Commission to hold any hearings and conduct any investigations in any part of the State necessary to carry out its powers and duties and, for those purposes, has the same powers as are conferred upon heads of departments of the state by Government Code sections 11180, et seq. Those powers include conducting investigations and prosecuting actions concerning: all matters relating to the business activities and subjects under the jurisdiction of the Commission; violations of any law or rule or order of the Commission; and such other matters as may be provided by law. (Gov't. Code § 11180.)

In connection with such investigations and actions, the Commission may: inspect and copy books, records, and other items; hear complaints;

present information or evidence obtained or developed from the investigation of unlawful activity to a court or at an administrative hearing in connection with any action or proceeding. (Gov't. Code § 11181.)

Furthermore, Public Resources Code section 25900 authorizes the Commission to request the Attorney General to petition a court to enjoin any violation or threatened violation which constitutes an emergency requiring immediate action to protect the public health, welfare, or safety. The court

shall have jurisdiction to grant such prohibitory or mandatory injunctive relief as may be warranted by way of temporary restraining order, preliminary injunction, and permanent injunction.

(Pub. Resources Code § 25900.)

Finally, section 25218(e) authorizes the Commission to “[a]dopt any rule or regulation, or take any action, it deems responsible and necessary to carry out the provisions of [the Warren-Alquist Act]” while section 25218.5 provides that “the provisions specifying any power or duty of the commission shall be liberally construed, in order to carry out the objectives of this division.” In sum, the Public Resources Code, the Government Code, and the Commission’s own regulations provide ample authority for the Commission to take the requested actions.

Ormat’s conduct flies squarely in the face of the Commission’s jurisdiction over thermal power plant development in general, and the procedural mandates of its facility siting process in particular. It also prejudices the Commission’s ability, and its obligation, to ensure that all

significant environmental impacts from thermal power plant development are mitigated and to evaluate all feasible alternatives to such development. The Commission should take firm, deliberate, and immediate action to affirm its jurisdiction over Ormat's activities, to act to halt them immediately pending a complete review of this investigation, and to impose whatever sanction and/or remedial measures are necessary and proper to effectuate the Warren-Alquist Act.

VIII. Names and Addresses of Individuals, Organizations, and Businesses Potentially Affected by the Relief Sought

1. Imperial County
Planning and Development Services
801 Main Street
El Centro, CA 92243

2. Imperial County Air Pollution Control District
150 South 9th Street
El Centro, CA 92243-2801
Fax (760) 353-9904

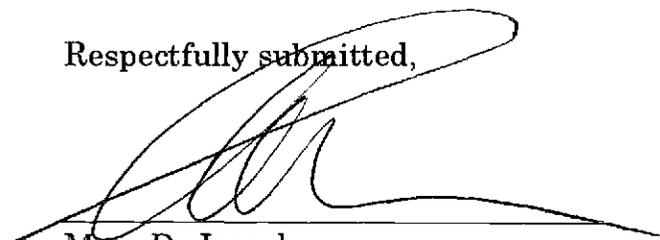
3. Imperial Irrigation District
333 E. Barioni Boulevard
Imperial, CA 92251
Fax: (760) 339-9262

CONCLUSION

Based on the foregoing, CURE respectfully requests the Commission to take immediate action, consistent with its authority, to investigate and halt the ongoing violation of Section 25500 by Ormat and to order and seek any necessary and proper corrective actions to remedy Ormat's violations.

Dated: June 28, 2011

Respectfully submitted,

A large, stylized handwritten signature in black ink, appearing to be 'M. Joseph', is written over a horizontal line.

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Tanya A. Gulesserian
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Attorneys for CURE

DECLARATION

I, Elizabeth Klebaner, declare as follows:

1. I am the attorney of record for Petitioner California Unions for Reliable Energy.

2. I have read the foregoing VERIFIED COMPLAINT AND REQUEST FOR INVESTIGATION BY CALIFORNIA UNIONS FOR RELIABLE ENERGY and all attachments thereto and know the contents thereof.

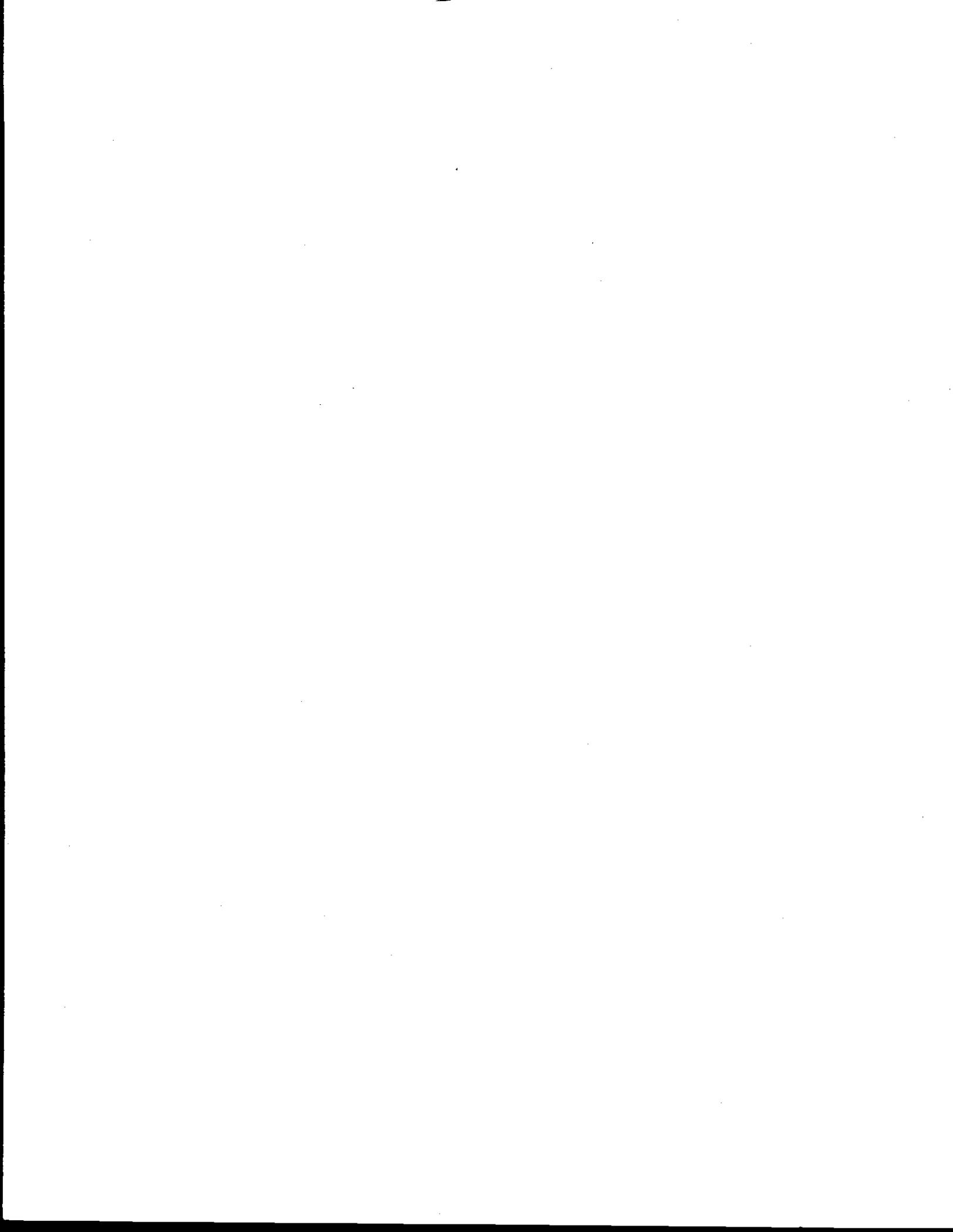
3. I am informed and believe that the matters stated therein are true and correct and, on that ground, I allege that the matters stated therein are true and correct.

I declare, under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

Dated: 6/28/2011

By: 
Elizabeth Klebaner

Attachment A



North Brawley System Impact Study

An Analysis for the
Imperial Irrigation District



~Final Report~
December 11, 2007

REVISION 1
January 8, 2009

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Appendix D – Peak Heavy Summer Transient Stability Plots – Post Project

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Appendix F – Short Circuit Analysis

Appendix G – Sensitivity Short Circuit Analysis

Appendix H – Post-Transient Stability Analysis

Revision #1:

The North Brawley project representative reported via email to IID Energy Department a change on the project Phase B 13.2/92 kV transformer impedance value on November 24, 2008. The new transformer impedance value changed from 12% @ 37 MVA base to 12% @ 55 MVA base. It triggered the need for re-study the North Brawley project system impact study on the power flow and short circuit analyses sections.

The re-study was considering the following: a) The North Brawley project modeled with all the three phases (A, B, and C) in-service, b) The original IID system topology and c) The IID system demand and generating resources as in the Final Report issued on 12/11/2007.

The purpose of the re-study was to compare study results by implementing the transformer impedance value change and determine if there will be any new or modification to the previously reported system impact that requires mitigation.

The re-study results for the power flow (Heavy Summer and Light Winter conditions) and short circuit (all generation in-service) analyses were very similar to the ones obtained before making the transformer impedance change. The most relevant change in study results was on the short circuit value for the Euclid Substation 92 kV bus which before the change was 20,159 Amperes (101 % of the breaker interrupting capability) and after the transformer impedance change it became 20,172 Amperes (101%). This represents a breaker interrupting capability violation that requires mitigation.

Therefore, once we have completed the re-study for this project, IID does not report any new or modification to the previously reported system impacts that require mitigation. The differences between the Final Report and the attached Revision #1 are the following:

- This additional summary page
- Appendix F – Short Circuit Analysis
- Appendix G – Sensitivity Short Circuit Analysis

If you have any questions, please call me at (760) 482-3443.

Jorge L. Barrientos, PE
IID System Planning Supt.

EXECUTIVE SUMMARY

Power Flow Analysis

KEMA Inc. and IID's Planning Section performed the Power Flow Analysis to review the impact of the proposed North Brawley 150 MW generation project ("Project") when delivering power to IID internal electrical network (50 MW), (50 MW) to SCE and 50 MW for North Brawley load project in the 2010 timeframe. The base case has modeled the new IID Niland Generation Project with 100 MW (Heavy Summer ON-Line, Light Winter OFF-Line). The Project was modeled as Twelve 12.5 MW generators connected to the "CO" 92 kV line. The System Impact Study included power flow, transient and post-transient stability analysis for peak (heavy summer) and off-peak (light winter) conditions, modeled using Western Electric Coordinating Council ("WECC") cases with a detailed IID system representation for 2010. The short circuit analysis, performed by PDS consulting, PLC, is also included as part of this system impact study at the request of IID.

For the conditions modeled, the system impact study indicated that the addition of the North Brawley Project will have some impact on IID's voltage and thermal loading conditions for the different scenarios studied under normal and contingency conditions. Voltage deviation and thermal rating violations attributable to the addition of the Project will require the design and implementation of a few System Operating Procedures (SOPs) and/or system upgrades. The addition of the Project and its associated dispatch to Southern California Edison showed 2.5 MW increase on IID system losses for the Heavy Summer and 5.0 MW for the Light Winter system condition. The study results show that there were pre-existing voltage and thermal violations under outage conditions that were not attributable to the project. These system violations were not included in this report and are being addressed in other planning forums.

Transient Stability

KEMA Inc. on behalf of Imperial District ("IID") performed this Transient Stability analysis indicated that the addition of the Project does not adversely impact the stability response of the system. On stability outages of the generator transformers, it has been noted that the generator itself must be tripped. Generation tripping for the loss of the step-up transformer is a common practice and does not represent any additional problems to the IID system.

Short Circuit Analysis

A short circuit analysis was performed by PDS consulting, PLC. The executive summary reports the following:

A short circuit study and breaker capability analysis has been performed to determine the impact of the additional North Brawley generation facility to the IID Energy transmission system. The analysis found minimal impacts to the interrupting capability of the IID Energy transmission system due to the addition of the North Brawley generation facility. The analysis also found that the interrupting capability of two of the breakers, H40 and H50, at the Euclid Substation will be exceeded (the pre-Project fault levels were at 99% of the interrupting capability while the post-Project fault level was found to be 101%), however IID Energy can re-schedule to an earlier date a project to replace the affected equipment with sufficient interrupting capacity prior to the in-service date of the North Brawley project.

The results of the study also indicated that there are a few fault interrupting devices on the IID Energy system which have fault current exposure levels near of their respective interrupting ratings (specifically Imperial Valley 230kV and El Centro 92kV). However, these interrupting rating concerns have been identified as pre-existing conditions and not directly related to the North Brawley generation project.

Sensitivity Short Circuit Analysis

A sensitivity analysis of to the original short circuit study and breaker capability analysis has been performed per project owner request to determine the impact of the North Brawley project phase A (6 generators in the amount of 12.5MW each) connected to the IID Energy transmission system. The analysis found that the fault duty at the Euclid 92 kV substation will exceed the interrupting capability of two of the breakers, H40 and H50, at this substation (the pre-Project fault levels were at 98.4% of the interrupting capability while the post-Project fault level was found to be 100.04%), Even though these short circuit violations are marginal, the IID standard requires the replacement of these breakers once they reach their interrupting capability.

Post-Transient Stability Analysis

The addition of the North Brawley Project did not impact the existing reactive power margins at selected buses for all the outage simulation studied with the exception of the Imperial Valley – Miguel 500 kV line outage. An outage of the Imperial Valley-Miguel 500 kV line caused the reactive power margin at five (5) IID buses to decrease up to 4 MVAR. In particular, the addition of the North Brawley Project and the subsequent outage of the Imperial Valley –Miguel 500 kV line caused the reactive power margin at N. LAQUITA 92 kV bus to decrease from 103 MVAR to 99 MVAR.

A summary of the post-transient reactive power margin analysis can be found at Appendix B. Positive reactive power margins were obtained at all the buses monitored following the selected outages.

1 INTRODUCTION

KEMA Inc. and PDS Consulting, on behalf of Imperial Irrigation District (“IID”), performed this System Impact Study to review the impact of the proposed North Brawley 150 MW generation project (“Project”) when delivering power to IID internal network (50 MW), (50 MW) to SCE and 50 (MW) to serve the Project internal load in the 2010 timeframe. The base case has modeled the new IID Niland Generation Project with 100 MW (Heavy Summer ON-Line, Light Winter OFF-Line). The Project was modeled as Twelve 12.5 MW generators connected to the “CO” 92 kV line. The System Impact Study included power flow, transient and post-transient stability analysis for peak (heavy summer) and off-peak (light winter) conditions, modeled using Western Electric Coordinating Council (“WECC”) cases with a detailed IID system representation for 2010. The short circuit analysis, performed by PDS consulting, PLC, is also included as part of this system impact study at the request of IID.

2 STUDY ASSUMPTIONS

2.1 Cases Studied

This North Brawley analysis used power flow models representative of an IID 2010 system. The following peak (heavy summer) and off-peak (light winter) scenarios were studied:

Season	PSM Case Name	Description
Heavy Summer	Pre-Project	Planned heavy summer configuration without the Project
Heavy Summer	Post-Project	Planned heavy summer configuration with Project - net output 100 MW
Light Winter	Pre-Project	Planned light winter configuration without the Project
Light Winter	Post-Project	Planned light winter configuration with the Project - net output 100 MW

2.2 Case Assumptions

The two WECC Approved Power Flow Base Cases used to develop the North Brawley System Impact Study were:

Heavy summer 10hs1a.SAVApproved 08/24/05

Light winter 12lw1sa.SAVApproved 01/19/06

Both cases were selected because they were the most recently developed and available cases in the WECC library in the vicinity of the Project’s in-service date. The IID system loads, resources, and topology were adjusted to represent the conditions expected in the year the Project planned to initiate operations.

The 2010 case used to model the impact of the Project included planned transmission elements internal to the IID system for the timeframe as well as the following changes to the base case:

- Generation was modeled according to the IID’s current generation interconnection (IID Queue list) that reflects generation expected to be in operation during the study time frame. The generation at Niland 92 kV substation was dispatched according to typical usage, Heavy Summer ON-Line, Light Winter OFF-Line.
- IV – Dixieland 230 kV line and 230/92 kV transformer.
- El Centro 230/92 kV transformer.

2.3 Dynamic Models

The stability models used for the Project were provided by the Project sponsor and included:
Generator – GENSA1 - Salient pole generator represented by equal mutual inductance rotor modeling.

Exciter – EXAC8B – Brushless exciter with PID voltage regulator.

Governor – W2301- Woodward 2301 governor and basic turbine model.

2.4 Loads and Resources

The table below shows the IID loads, losses, generation, and area interchange for the cases studied.

Case	Summer Pre	Summer Post	Winter Pre	Winter Post
Load (MW)	1193.6	1243.6	268.5	318.5
Load (MVAR)	443.8	474.7	60.7	91.6
Losses (MW)	58.1	59.5	37.0	42.7
Losses (MVAR)	323.5	332.6	195.3	243.3
Interchange (MW)	74	174	770.7	870.3
Total IID Shunts (MVAR)	-558.7	-587.8	-197.4	-214.4
IID Generation (MW)	1325.5	1476.9	1076.3	1231.5
IID Generation (MVAR)	179.9	209.7	60.7	112.1

2.5 Power Flow Evaluation Criteria

For this analysis, the system was evaluated for its thermal loading capacity and voltage performance (primarily voltage drop). The system was evaluated both with all lines in service and under emergency or unplanned outage conditions that might occur such as the outage of a line or transformer. WECC Reliability Criteria and the North American Electric Reliability Council ("NERC") Planning Standards were used to evaluate the system as noted below. While the NERC/WECC criteria are applicable, the interconnecting transmission system owner/operator may have stricter voltage or thermal conditions based on operating or reliability needs.

The following criteria were used to determine the impact of the facility on IID's system for pre-contingency and post-contingency conditions:

- Pre-disturbance bus voltage must be between 0.95 per unit and 1.05 per unit. (an IID-specific requirement)
- Allowable voltage deviation of five (5) percent for N-1 Contingency (Limiting factor)

Attachment B



FIRST AMENDED AND RESTATED
ENGINEERING AND PROCUREMENT
AGREEMENT

BETWEEN

IMPERIAL IRRIGATION DISTRICT

AND

ORMAT NEVADA INC.

FOR THE

NORTH BRAWLEY GEOTHERMAL PROJECT

**FIRST AMENDED AND RESTATED
ENGINEERING AND PROCUREMENT AGREEMENT**
between
IMPERIAL IRRIGATION DISTRICT
and
ORMAT NEVADA INC.

THIS FIRST AMENDED AND RESTATED AGREEMENT is made and entered into this ____ day of May, 2008 (the "Effective Date") by and between Ormat Nevada Inc., a California corporation organized and existing under the laws of the State of California ("Interconnection Customer"), and Imperial Irrigation District, an irrigation district organized under the Water Code of the State of California, ("Transmission Provider"). Interconnection Customer and Transmission Provider each may be referred to as a "Party," or collectively as the "Parties."

RECITALS

WHEREAS, Interconnection Customer is proposing to develop a geothermal generating facility ("Generating Facility") or additional generating capacity to an existing Generating Facility consistent with the interconnection request submitted by Interconnection Customer dated December 13, 2007 (the "Interconnection Request"); and

WHEREAS, Interconnection Customer desires to interconnect the Generating Facility with the Transmission System; and

WHEREAS, Transmission Provider has completed an interconnection system impact study (the "System Impact Study") and provided the results of said study to Interconnection Customer; and

WHEREAS, Interconnection Customer has requested Transmission Provider to perform an interconnection facilities study (the "Interconnection Facilities Study") to specify and estimate the cost of the equipment, engineering, procurement and construction work needed to implement the conclusions of the System Impact Study to physically and electrically connect the Generating Facility to the Transmission System; and

WHEREAS, In parallel with the performance of the Interconnection Facilities Study, Interconnection Customer has authorized the Transmission Provider to begin engineering and procurement of long lead-time items necessary for the establishment of the interconnection in order to advance the implementation of the Interconnection Request; and

WHEREAS, This Agreement is subject to the terms and conditions set forth in Transmission Provider's Open Access Transmission Tariff (the "OATT"), including any future amendments thereto, and the OATT is hereby incorporated herein by reference;

WHEREAS, Capitalized terms used herein but not expressly defined herein shall have the meanings set forth in Transmission Provider's Generator Interconnection Procedure (the "GIP"), including any future amendments thereto, and the GIP is hereby incorporated herein by reference; and

WHEREAS, this Agreement supersedes and replaces the Engineering and Procurement Agreement dated on or about March 14, 2008 between the Parties.

NOW, THEREFORE, in consideration of and subject to the mutual covenants contained herein the Parties agreed as follows:

- 1.0 Voluntary Agreement.** Interconnection Customer acknowledges and understands that Transmission Provider is not required to enter into this Agreement, or any other engineering and procurement contract, but Transmission Provider is doing so voluntarily in the spirit of cooperation. Interconnection Customer also acknowledges and understands that this agreement is not a formal interconnection agreement, but is merely an interim contract, and that Interconnection Customer is still required to execute a definitive Generator Interconnection Agreement with Transmission Provider.
- 2.0 Queue Position.** The Parties acknowledge and agree that this Agreement will not impact Interconnection Customer's queue position or the Generating Facility's in-service date.
- 3.0 Authorization to Proceed; Costs and Expenses.** As of the Effective Date, Interconnection Customer authorizes Transmission Provider to proceed with the authorized activities identified in Attachment A hereto (the "Authorized Activities"). Interconnection Customer agrees to pay all costs and expenses directly related to the Authorized Activities. Interconnection Customer shall provide an initial deposit in the amount of \$869,758.00 which Transmission Provider may draw upon as necessary to fund each Authorized Activity. If additional monies are required to complete the Authorized Activities, then Transmission Provider shall promptly notify Interconnection Customer, and Interconnection Customer agrees to make a second deposit to cover such additional costs and expenses. Transmission Provider shall be under no obligation to perform any Authorized Activity unless Interconnection Customer shall have deposited adequate funds to pay for such work.
- 4.0 Estimates Only.** Since Transmission Provider has no control over the cost of labor, materials or equipment furnished by others, or over the resources provided by others to meet proposed timetables, the estimated costs set forth in Attachment A and the estimated schedule set forth in Attachment B are furnished only for the convenience of Interconnection Customer. They are intended to reflect the costs and timetables of similar work under favorable conditions. Because of unforeseen contingencies

and other factors, the actual costs may be considerably higher or lower, and the actual completion date(s) may be considerably earlier or later. Therefore, the estimated costs and schedule are not a guarantee by Transmission Provider of the actual cost and time required to complete all of the Authorized Activities.

- 5.0 Statements; Surplus Funds.** Upon the completion of all Authorized Activities, Transmission Provider shall provide Interconnection Customer with an accounting of all costs incurred in performing said work in sufficient detail to allow verification of such costs. Such costs may include, but shall not be limited to, associated labor, materials and supplies, outside services, and administrative and general expenses. If there are surplus funds following the completion of all Authorized Activities, then the remaining monies shall be promptly refunded to Interconnection Customer without interest.
- 6.0 Periodic Updates.** Transmission Provider agrees to interface with a designated Interconnection Customer representative regarding the Authorized Activities, and to provide said representative with periodic updates on work schedules and milestones, as well as current and anticipated costs and expenses.
- 7.0 Standard of Care; Express Disclaimer.** Transmission Provider shall exercise the same degree of care, skill and diligence in the performance of the Authorized Activities as is ordinarily exercised by an irrigation district utility under similar circumstances. No other warranty, express or implied, is included in this Agreement, or in any drawing, specification or report produced pursuant to this Agreement. Further, Interconnection Customer acknowledges and agrees that this Agreement shall not be construed as confirming or endorsing in any manner or fashion the design of the Generating Facility, or as any warranty of safety, durability, reliability or suitability of the Generating Facility or installation thereof for any use, including the use intended by Interconnection Customer.
- 8.0 Termination.** This Agreement shall terminate automatically upon the completion of all Authorized Activities set forth in Attachment A, or upon the execution of the Generator Interconnection Agreement by both Interconnection Customer and Transmission Provider. Transmission Provider may terminate this Agreement early for cause upon five (5) days advance written notice in the event Interconnection Customer (a) fails to timely comply with any material requirement of this Agreement, (b) fails to meet any of the milestones specified in the GIP, or (c) fails to comply with any of the prerequisites specified in the GIP. Interconnection Customer may terminate this agreement early for cause upon five (5) days advance written notice in the event Transmission Provider fails to timely comply with any material requirement of this Agreement, or for convenience upon ten (10) days advance written notice. Upon termination

of this Agreement pursuant to this Article 8.0, the rights and obligations of the Parties hereunder shall terminate, except for (x) rights and obligations accrued as of the time of termination, (y) rights and obligations arising out of events occurring prior to the termination, and (z) all other rights and obligations of the Parties which by their terms survive termination or which by their nature or by implication are intended to survive termination.

9.0 Cancellation Costs. In the event this Agreement is terminated early for cause by Transmission Provider, or terminated early for convenience by Interconnection Customer pursuant to Article 8.0 above, then Interconnection Customer shall pay any cancellation costs incurred by Transmission Provider for all equipment ordered prior to the termination date which cannot be reasonably mitigated. In the event this Agreement is terminated early for cause by Interconnection Customer pursuant to Article 8.0 above, then Transmission Provider shall bear all cancellation costs incurred for all equipment ordered prior to the termination date.

10.0 Treatment of Equipment. In the event this Agreement is terminated early for cause by Transmission Provider, or terminated early for convenience by Interconnection Customer pursuant to Article 8.0 above, then Transmission Provider may elect the following if the equipment cannot be reasonably canceled:

(a) Take title to the equipment, in which event Transmission Provider shall refund to Interconnection Customer any amounts paid by Interconnection Customer for such equipment, including delivery costs; or

(b) Transfer title to and deliver such equipment to Interconnection Customer, in which event Interconnection Customer shall pay any unpaid balance and cost of delivery for such equipment.

11.0 Indemnity. The Parties shall at all times indemnify, defend, and hold the other Party harmless from, any and all damages, losses, claims, including claims and actions relating to injury to or death of any person or damage to property, demand, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the other Party's action or inactions of its obligations under this Agreement on behalf of the Indemnifying Party, except in cases of gross negligence or intentional wrongdoing by the Indemnified Party.

(a) Promptly after receipt by an Indemnified Party of any claim or notice of the commencement of any action or administrative or legal proceeding or investigation as to which the indemnity provided for in this Agreement may apply, the Indemnified Party shall notify the Indemnifying Party of such fact. Any failure of or delay in such

notification shall not affect a Party's indemnification obligation unless such failure or delay is materially prejudicial to the Indemnifying Party.

- (b) The Indemnifying Party shall have the right to assume the defense thereof with counsel designated by such Indemnifying Party and reasonably satisfactory to the Indemnified Party. If the defendants in any such action include one or more Indemnified Parties and the Indemnifying Party, and if an Indemnified Party reasonably concludes that there may be legal defenses available to it and/or other Indemnified Parties which are different from or additional to those available to the Indemnifying Party, the Indemnified Party shall have the right to select separate counsel to assert such legal defenses and to otherwise participate in the defense of such action on its own behalf. In such instances, the Indemnifying Party shall only be required to pay the fees and expenses of one additional attorney to represent an Indemnified Party or Indemnified Parties having such differing or additional legal defenses.
- (c) The Indemnified Party shall be entitled, at its expense, to participate in any such action, suit or proceeding, the defense of which has been assumed by the Indemnifying Party. Notwithstanding the foregoing, the Indemnifying Party (i) shall not be entitled to assume and control the defense of any such action, suit or proceedings if and to the extent that, in the opinion of the Indemnified Party and its counsel, such action, suit or proceeding involves the potential imposition of criminal liability on the Indemnified Party, or there exists a conflict or adversity of interest between the Indemnified Party and the Indemnifying Party, in such event the Indemnifying Party shall pay the reasonable expenses of the Indemnified Party, and (ii) shall not settle or consent to the entry of any judgment in any action, suit or proceeding without the consent of the Indemnified Party, which shall not be unreasonably withheld, conditioned or delayed.
- (d) If an Indemnified Party is entitled to indemnification under this Agreement as a result of a claim by a third party, and the Indemnifying Party fails, after notice and reasonable opportunity to proceed, to assume the defense of such claim, such Indemnified Party may, at the expense of the Indemnifying Party, contest, settle or consent to the entry of any judgment with respect to, or pay in full, such claim.
- (e) If an Indemnifying Party is obligated to indemnify and hold any Indemnified Party harmless under this Agreement, the amount owing to the Indemnified Party shall be the amount of such Indemnified Party's actual Loss, net of any insurance or other recovery.

- 12.0 Consequential Damages.** In no event shall either Party be liable under any provision of this Agreement for any losses, damages, costs or expenses for any special, indirect, incidental, consequential, or punitive damages, including but not limited to loss of profit or revenue, loss of the use of equipment, cost of capital, cost of temporary equipment or services, whether based in whole or in part in contract, in tort, including negligence, strict liability, or any other theory of liability.
- 13.0 Confidentiality.** "Confidential Information" shall include, without limitation, all information relating to a Party's technology, research and development, business affairs, and pricing, and any information supplied or disclosed by either Party to the other prior to the execution of this Agreement. Information is Confidential Information only if it is clearly designated or marked in writing as confidential on the face of the document or, if the information is conveyed orally or by inspection, if the Party providing the information orally informs the Party receiving the information that the information is confidential. Confidential Information supplied or disclosed pursuant to this Agreement shall be subject to the confidentiality provisions set forth in the OATT.
- 14.0 Delay in Performance.** Neither Transmission Provider nor Interconnection Customer shall be considered in breach of this Agreement for delays in performance caused by circumstances beyond the reasonable control of the nonperforming party.
- 15.0 Obligations of the Parties.** The obligations of the Parties hereunder shall be several and not joint, and neither Party shall have any right, power or authority to enter into any agreement for, act on behalf of, or to act as an agent or representative of, or to otherwise bind or obligate the other Party. This Agreement shall not be interpreted or construed to create an agency, association, joint venture or partnership relationship between the Parties.
- 16.0 Third Party Rights.** This Agreement and all rights hereunder are intended for the sole benefit of the Parties and, to the extent expressly provided, for the benefit of the Indemnified Parties, and shall not imply or create any rights on the part of, or obligation to, any other person or entity.
- 17.0 Assignment.** Neither Party shall voluntarily assign its rights nor delegate its duties under this Agreement, or any part of such rights or duties, without the written consent of the other Party, which consent shall not be unreasonably withheld, except in connection with the sale, merger, or transfer of a substantial portion of its assets and/or properties (or in the case of Transmission Provider, its transmission facilities) so long as the assignee in such a sale, merger, or transfer assumes directly all rights, duties and obligations arising under this Agreement. Any such assignment or delegation made without such written consent or assumption, as the case may be, shall be null and void.

- 18.0 Dispute Resolution.** Disputes under this Agreement shall be resolved in accordance with procedures set forth in the OATT. The Parties acknowledge and agree that arbitration under the OATT is discretionary. In the event the designated senior representatives of Interconnection Customer and Transmission Provider are unable to resolve a dispute by mutual agreement within thirty (30) days (or such other period as the Parties may agree upon), nothing in this Article 18.0 shall restrict either Party from thereafter electing to resolve the dispute in state or federal court located in Imperial County, California.
- 19.0 Governing Law.** The validity, interpretation and performance of this Agreement and each of its provisions shall be governed by the applicable laws of the State of California without regard to its conflicts of law provisions.
- 20.0 Amendments.** No alterations or amendment of this Agreement shall be binding on either Party unless reduced to writing and signed by the authorized representative of Interconnection Customer and the authorized representative of Transmission Provider. The terms and conditions of this Agreement shall be amended, as mutually agreed to by the Parties, to comply with changes or alterations made necessary by any valid applicable order of any Governmental Authority, or any court, having jurisdiction over this Agreement.
- 21.0 Integration.** This Agreement constitutes the entire and integrated agreement between Interconnection Customer and Transmission Provider. It supersedes all prior and contemporaneous communications, proposals, representations, negotiations or agreements, whether written or oral, relating to the subject matter of this Agreement.

* * *

IN WITNESS WHEREOF, the Parties have caused this Agreement to be duly executed by their duly authorized officers or agents on the day and year first above written.

IMPERIAL IRRIGATION DISTRICT

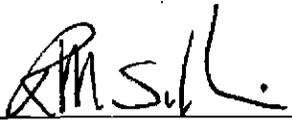
By: 

Name: David L. Barajas

Title: Gen. Supt. Transmission Planning and Contracts

Date: June 12/08

ORMAT NEVADA INC.

By: 

Name: Robert Sullivan

Title: Authorized Representative

Date: 29 May 08

ATTACHMENT A

Authorized Activities

A short circuit study and breaker capability analysis has been performed to determine the impact of the additional North Brawley generation facility to the IID Energy transmission system (*North Brawley System Impact Study Report dated December 11, 2007*).

The analysis identified the interrupting capability of two (2) IID Energy owned breakers, H40 and H50, at the Euclid Substation exceed the interrupting capabilities. To mitigate the impacts Ormat Nevada Inc. authorizes IID Energy to proceed with all the required activities required to procure the following:

1. Quantity of two (2) high voltage three phase, sulfur hexafluoride, 121kV, 550kV BIL, 60 Hertz, 2000 Ampere, 40kA Interrupting, Dead Tank Power Circuit Breakers with Synchronous Switching Control at an estimated cost of \$55,447.00 each for a total of \$110,894.00.

ATTACHMENT A - FIRST AMENDMENT AND RESTATMENT

Following the results of the *Facility Study Draft dated April 24, 2008*, other requirements must be met to interconnect the North Brawley generating facility with the IID Energy electrical grid. To mitigate the impacts, Ormat Nevada Inc. authorizes IID Energy to proceed with all the activities required to procure and engineer the following:

2. 92kV line tap equipped with a group operated disconnect switches at an estimated cost of \$194,641.00.
3. 92kV line protection panel commissioning and testing and fiber optic multiplexing equipment for current differential relaying at an estimated cost of \$154,792.00.
4. Remote relay replacement at an estimated cost of \$26,809.00, see note 1.
5. Coordination study to determine the appropriate settings for all protective equipment at an estimated cost of \$15,000.00.
6. Special Protection Schemes (SPS) design and installation at an estimated cost of \$250,000.00.
7. SCADA and Revenue Metering at an estimated cost of \$36,276.00.
8. Communications and Fiber Optic at an estimated cost of \$63,994.00.
9. Project Commissioning at an estimated cost of \$0.00, note 2.
10. Euclid H20 and H50 Circuit Switcher Replacement at an estimated cost of \$28,246.00, see note 3.
11. Expediting charges for the procurement of equipment at an estimated cost of \$100,000.

Authorized Activities Total: \$869,758.00

Notes:

1. Interconnection Customer will contract this portion of work which includes engineering and material procurement. Transmission Provider will approve the design and procurement.
2. Interconnection Customer will allocate Project Commissioning cost to Transmission Provider for the Construction Phase of the project.
3. Interconnection Customer to replace two new circuit switchers at current market value. Transmission Provider will install two circuit switchers from stock. Interconnection Customer has remitted \$110,894.00 for reservation of the two circuit switchers stocked by Transmission Provider. Remaining costs are for engineering review by Transmission Provider.

ATTACHMENT B

Schedule

- (1) The Schedule below lists the activities required to procure two (2) high voltage three phase, sulfur hexafluoride, 121kV, 550kV BIL, 60 Hertz, 2000 Ampere, 40kA Interrupting, Dead Tank Power Circuit Breakers with Synchronous Switching Control.

Material - 92kv Breakers	32w	03/10/08	08/25/08
Prepare Purchase Order	3w	03/10/08	03/17/08
Manufacturing/Delivery	29w	03/17/08	08/17/08
Prepare Approval Drawings	6w	03/17/08	04/14/08
Review Approval Drawings	3w	04/14/08	04/16/08
Issue Final Drawings	4w	04/16/08	05/05/08
Delivery - 92kV Breakers	16w	05/05/08	08/25/08

- (2) The Schedule below lists the activities necessary to meet the requirements of the Facility Study Draft:

Additional Modifications	22w	05/14/08	10/15/08
92kV Line Tap	22w	05/14/08	10/15/08
92kV Line Protection Panel	20w	05/14/08	10/01/08
Remote Relay Replacement	20w	05/14/08	10/01/08
Coordination Study	4w	05/14/08	06/11/08
SPS Design & Installation	20w	05/14/08	10/01/08
RTU Engineering & Installation	20w	05/14/08	10/01/08
Revenue Metering	22w	05/14/08	10/15/08

Attachment C



PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

ENERGY DIVISION

RESOLUTION E-4126
March 13, 2008

REDACTED

R E S O L U T I O N

Resolution E-4126. Southern California Edison Company requests approval of two renewable portfolio standard power purchase agreements between Caithness Dixie Valley, LLC and ORNI #18, LLC. These contracts are approved without modifications.

By Advice Letter (AL) 2137-E filed on July 13, 2007, AL 2137-E-A filed on August 16, 2007 and AL 2137-E-B filed on January 10, 2008

SUMMARY

Southern California Edison's (SCE) renewable energy contracts comply with the Renewable Portfolio Standard (RPS) procurement guidelines and are approved

SCE filed advice letter (AL) 2137-E on July 13, 2007 requesting Commission review and approval of two renewable energy power purchase agreements (PPAs) executed with Caithness Dixie Valley, LLC (Dixie Valley) and ORNI #18, LLC (ORNI 18). SCE filed AL 2137-E-A on August 16, 2007 to supplement, in part, AL 2137-E in order to include the Independent Evaluation Report for SCE's 2006 renewable resource solicitation. SCE filed AL 2137-E-B on January 10, 2008 to supplement, in part, AL 2137-E and AL 2137-E-A to reflect changes to the PPAs made in order to comply with Commission Decision (D.) 07-11-025, "Opinion on Amended Petition for Modification of Decision 04-06-014 Regarding Standard Terms and Conditions", issued November 19, 2007.

Generating facility	Type	Term Years	MW Capacity	GWh Energy	Online Date	Location
Dixie Valley	Geothermal, existing	20	50	394	7/2018	Dixie Valley, NV
ORNI #18	Geothermal, new	20	50-100	416-832	12/2009	North Brawley, CA

The Agreement between Caithness Dixie Valley and SCE is for 20 years of geothermal energy from an existing plant. Currently, SCE receives eligible renewable energy from this facility under an interim standard offer no. 4 (ISO4) contract. The Dixie Valley contract will begin in July 2018, when the ISO4 is set to expire. The ORNI 18 project is for 20 years of geothermal energy from a new facility, expected to be come online in December 2009.

Deliveries from these PPAs are reasonably priced and the contract prices are fully recoverable in rates over the life of the contract, subject to Commission review of SCE's administration of the contracts. Both contract prices are below the 2006 market price referent.

Confidential information about the contract should remain confidential

This resolution finds that certain material filed under seal pursuant to Public Utilities (Pub. Util.) Code Section 583, General Order (G.O.) 66-C, and D.06-06-066 should be kept confidential to ensure that market sensitive data does not influence the behavior of bidders in future RPS solicitations.

BACKGROUND

The RPS Program requires each utility to increase the amount of renewable energy in its portfolio

The California RPS Program was established by Senate Bill 1078, effective January 1, 2003. It requires that a retail seller of electricity such as SCE purchase a certain percentage of electricity generated by Eligible Renewable Energy Resources (ERR). The RPS program is set out at Public Utilities Code Section 399.11, et seq. SB 1078 required each utility to increase its total procurement of ERRs by at least 1% of annual retail sales per year so that 20% of its retail sales would be supplied by ERRs by 2017.

The State's Energy Action Plan (EAP) called for acceleration of this RPS goal to reach 20 percent by 2010. This was reiterated again in the Order Instituting Rulemaking (R.04-04-026) issued on April 28, 2004¹, which encouraged the utilities to procure cost-effective renewable generation in excess of their RPS annual procurement targets² (APTs), in order to make progress towards the goal expressed in the EAP.³ On September 26, 2006, Governor Schwarzenegger signed

¹ http://www.cpuc.ca.gov/Published/Final_decision/36206.htm

² APT - An LSE's APT for a given year is the amount of renewable generation an LSE must procure in order to meet the statutory requirement that it increase its total eligible renewable procurement by at least 1% of retail sales per year.

³ Most recently reaffirmed in D.06-05-039

Senate Bill 107⁴, which officially accelerated the State's RPS targets to 20 percent by 2010.

CPUC has established procurement guidelines for the RPS Program

In response to SB 1078, the Commission has issued a series of decisions that establish the regulatory and transactional parameters of the utility renewables procurement program. On June 19, 2003, the Commission issued its "Order Initiating Implementation of the Senate Bill 1078 Renewable Portfolio Standard Program," D.03-06-071⁵. Instructions for utility evaluation (known as 'least-cost, best-fit') of each offer to sell products requested in a RPS solicitation were provided in D.04-07-029.⁶ The Commission adopted Standard Terms and Conditions for RPS power purchase agreements in D.04-06-014⁷ as required by Public Utilities Code Section 399.14(a)(2)(D). In addition, D.06-10-050, as modified by D.07-03-046, refined the RPS reporting and compliance methodologies.⁸ In this decision, the Commission established methodologies to calculate an LSE's initial baseline procurement amount, annual procurement target (APT) and incremental procurement amount (IPT).⁹

On June 9, 2004, the Commission adopted its market price referent (MPR) methodology¹⁰ as required by Public Utilities Code Sections 399.14(a)(2)(A) and 399.15(c). On December 15, 2005, the Commission adopted D.05-12-042 which refined the MPR methodology for the 2005 RPS Solicitation.¹¹ Subsequent resolutions adopted MPR values for the 2005, 2006 and 2007 RPS Solicitations.¹²

⁴ SB 107, Chapter 464, Statutes of 2006

⁵ http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/27360.PDF

⁶ http://docs.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/38287.PDF

⁷ This decision has subsequently been modified. See next subsection.

⁸ D.06-10-050, Attachment A,

http://www.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/61025.PDF) as modified by D.07-03-046 (http://www.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/65833.PDF).

⁹ The IPT represents the amount of RPS-eligible procurement that the LSE must purchase, in a given year, over and above the total amount the LSE was required to procure in the prior year. An LSE's IPT equals at least 1% of the previous year's total retail electrical sales, including power sold to a utility's customers from its DWR contracts.

¹⁰ D.04-06-015; http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/37383.pdf

¹¹ http://www.cpuc.ca.gov/word_pdf/FINAL_DECISION/52178.pdf

¹² Respectively, Resolution E-3980:

http://www.cpuc.ca.gov/WORD_PDF/FINAL_RESOLUTION/55465.DOC, Resolution E-4049: http://www.cpuc.ca.gov/word_pdf/FINAL_RESOLUTION/63132.doc,

In addition, the Commission has implemented Pub. Util. Code 399.14(b)(2), which states that before the Commission can approve an RPS contract of less than ten years' duration, the Commission must establish "for each retail seller, minimum quantities of eligible renewable energy resources to be procured either through contracts of at least 10 years' duration (long-term contracts) or from new facilities commencing commercial operations on or after January 1, 2005." On May 3, 2007, the Commission approved D.07-05-028, which established a minimum percentage of the prior year's retail sales (0.25%) that must be procured with contracts of at least 10 years' duration or from new facilities commencing commercial operations on or after January 1, 2005 in order for short-term contracts to be used towards RPS compliance.

Commission requires certain terms and conditions in all RPS power purchase agreements

On June 9, 2004, the Commission adopted standard terms and conditions for RPS power purchase agreements as required by Pub. Util. Code Section 399.14(a)(2)(D). Of the fourteen standard terms and conditions adopted in D.04-06-014¹³, the Commission specified five that could be modified by parties, and nine that may not be modified or only modified in part. Two parties jointly filed a petition for modification on this decision, and subsequently an amended petition for modification. The Commission granted relief in substantial part in D.07-11-025, the "Opinion on Amended Petition for Modification of Decision 04-06-014 Regarding Standard Terms and Conditions".¹⁴

As a result of the D.07-11-025, ten standard terms and conditions are modifiable and four are non-modifiable. The non-modifiable terms and conditions that must be in every RPS power purchase agreement include: CPUC Approval, RECs and Green Attributes, Eligibility and Applicable Law. The Commission also requires that pending advice letters with contracts which have not yet been approved or rejected should be amended to comply with D.07-11-025.

Above-MPR costs can now be recovered in rates

Pursuant to SB 1078 and SB 107, the California Energy Commission (CEC) was authorized to "allocate and award supplemental energy payments" to cover above-market costs¹⁵ of long-term RPS-eligible contracts executed through a

Resolution E-4110:

http://www.cpuc.ca.gov/word_pdf/FINAL_RESOLUTION/73594.pdf

¹³ http://docs.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/37401.PDF

¹⁴ http://docs.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/75354.PDF

¹⁵ "Above-market costs" refers to the portion of the contract price that is greater than the appropriate market price referent (MPR).

competitive solicitation.¹⁶ The statute required that developers seeking above-market costs apply to the CEC for supplemental energy payments (SEPs).

This above-market cost recovery mechanism was reformed on October 14, 2007 when Governor Schwarzenegger signed SB 1036¹⁷, which authorizes the CPUC to provide above-MPR cost recovery through electric retail rates for contracts that are deemed reasonable. Above-MPR cost recovery has a 'cost limitation' equal to the amount of funds currently accrued in the CEC's New Renewable Resources Account, which had been established to collect SEP funds, plus the portion of funds that would have been collected through January 1, 2012. In addition, pursuant to SB 1036, Pub. Util. Code § 399.15(d)(2) provides that:

"The above-market costs of a contract selected by an electrical corporation may be counted toward the cost limitation if all of the following conditions are satisfied:

(A) The contract has been approved by the commission and was selected through a competitive solicitation pursuant to the requirements of subdivision(d) of Section 399.14.

(B) The contract covers a duration of no less than 10 years.

(C) The contracted project is a new or repowered facility commencing commercial operations on or after January 1, 2005.

(D) No purchases of renewable energy credits may be eligible for consideration as an above-market cost.

(E) The above-market costs of a contract do not include any indirect expenses including imbalance energy charges, sale of excess energy, decreased generation from existing resources, or transmission upgrades."

The CEC and CPUC are currently working collaboratively to implement SB 1036, which has an effective date of January 1, 2008.

SCE requests approval of two renewable energy contracts

On July 13, 2007, SCE filed AL 2137-E requesting Commission approval of two renewable power procurement contracts. SCE filed AL 2137-E-A and AL 2137-E-B to supplement, in part, AL 2137-E in order to include the Independent Evaluation Report for SCE's 2006 renewable resource solicitation and to comply with D.07-11-025, adopted on November 19, 2007. The ORNI 18 and Dixie Valley

¹⁶ Pub. Util. Code 399.15(d)

¹⁷ Chapter 685, Statutes of 2007 (SB 1036)

PPAs result from SCE's 2006 solicitation for renewable bids, which was authorized by D.06-05-039.

The Commission's approval of the PPAs will allow SCE to accept future deliveries of renewable resources and contribute towards the renewable energy procurement goals required by California's RPS statute.¹⁸ The proposed Dixie Valley will enable SCE to continue receiving renewable energy deliveries from this facility after the existing ISO4 contract expires in 2018. Procurement from the proposed ORNI 18 project is expected to contribute towards SCE's APT starting in 2009.

SCE requests "CPUC Approval" of PPAs

SCE requests a Commission resolution containing the following findings in order to satisfy the "CPUC Approval" terms in both the Dixie Valley and ORNI 18 Agreements:

1. Approval of the Dixie Valley and ORNI 18 Contracts in their entirety.
2. Approval of the modification of certain terms and condition in the Dixie Valley and ORNI 18 Contracts that are provided for in D.04-06-014¹⁹.
3. A finding that any electric energy sold or dedicated to SCE pursuant to the Dixie Valley and ORNI 18 Contracts constitute procurement by SCE from an eligible renewable resource (ERR) for the purpose of determining SCE's compliance with any obligation that it may have to procure from ERRs pursuant to the RPS Legislation or other applicable law concerning the procurement of electric energy from renewable energy resources.
4. A finding that all procurement under the Dixie Valley and ORNI 18 Contracts count, in full and without condition, towards any annual procurement target established by the RPS Legislation or the Commission which is applicable to SCE.
5. A finding that all procurement under the Dixie Valley and ORNI 18 Contracts count, in full and without condition, towards any incremental procurement target established by the RPS Legislation or the Commission which is applicable to SCE.

¹⁸ California Public Utilities Code section 399.11 et seq., as interpreted by D.03-07-061, the "Order Initiating Implementation of the Senate Bill 1078 Renewables Portfolio Standard Program", and subsequent CPUC decisions in Rulemaking (R.) 04-04-026, R.06-02-012 and R.06-05-027.

¹⁹ SCE requested this list of findings in AI 2137-E. Subsequently, SCE has modified the contract terms and conditions to comply with D.07-11-025, the "Opinion on Amended Petition for Modification of Decision 04-06-014 Regarding Standard Terms and Conditions".

6. A finding that all procurement under the Dixie Valley and ORNI 18 Contracts count, in full and without condition, towards the requirement in the RPS Legislation that SCE procure 20% (or such other percentage as may be established by law) of its retail sales from ERRs by 2010 (or such other date as may be established by law).
7. A finding that the Dixie Valley and ORNI 18 Contracts, and SCE's entry into these PPAs, is reasonable and prudent for all purposes, including, but not limited to, recovery in rates of payments made pursuant to the PPAs, subject only to further review with respect to the reasonableness of SCE's administration of the PPAs.
8. Any other and further relief as the Commission finds just and reasonable.

SCE's Procurement Review Group participated in review of the contracts

In D.02-08-071, the Commission required each utility to establish a "Procurement Review Group" (PRG) whose members, subject to an appropriate non-disclosure agreement, would have the right to consult with the utilities and review the details of:

1. Overall transitional procurement strategy;
2. Proposed procurement processes including, but not limited to, RFO; and
3. Proposed procurement contracts before any of the contracts are submitted to the Commission for expedited review.

SCE's PRG was formed on or around September 10, 2002. Current participants include representatives from the Commission's Energy Division, the Division of Ratepayer Advocates, The Utility Reform Network, the Natural Resources Defense Council, the Consumers' Union, California Utility Employees, and the California Department of Water Resources.

SCE asserts that its PRG was consulted during each step of the renewable procurement process. Among other things, SCE informed the PRG of the initial results of its request for proposals (RFP); explained the evaluation process; and updated the PRG periodically concerning the status of contract formation. On December 19, 2006, SCE advised the PRG of its proposed short-list of bids. On March 13, 2007, SCE updated the PRG as to the status of negotiations with bidders into SCE's 2006 RPS solicitation. On April 11, 2007, SCE briefed the PRG concerning the successful conclusion of discussions with Dixie Valley. On June 27, 2007, SCE briefed the PRG concerning the conclusion of discussions with ORNI 18.

Although Energy Division is a member of the PRG, it reserved its conclusions for review and recommendation on the PPA to the advice letter process.

NOTICE

Notice of AL 2137-E, AL 2137-E-A and AL 2137-E-B were made by publication in the Commission's Daily Calendar. Southern California Edison states that a copies of the Advice Letter were mailed and distributed in accordance with Section III-G of General Order 96-A.

PROTESTS

Advice Letters 2137-E, 2137-E-A and 2137-E-B were not protested.

DISCUSSION

Description of the projects

The following table summarizes the substantive features of the PPAs. See confidential Appendices C-1 and C-2 for detailed discussions of contract prices, terms, and conditions:

Generating facility	Type	Term Years	MW Capacity	GWh Energy	Online Date	Location
Dixie Valley	Geothermal, existing	20	50	394	7/2018	Dixie Valley, NV
ORNI #18	Geothermal, new	20	50-100	416-832	12/2009	North Brawley, CA

PPAs are consistent with SCE's CPUC adopted 2006 RPS Plan

California's RPS statute requires the Commission to review the results of a renewable energy resource solicitation submitted for approval by a utility.²⁰ The Commission will then accept or reject proposed PPAs based on their consistency with the utility's approved renewable procurement plan (Plan). SCE's 2006 Plan includes an assessment of supply and demand for renewable energy and bid solicitation materials, including a pro-forma agreement and bid evaluation methodology documents. The Commission conditionally approved SCE's 2006 RPS procurement plan, including its bid solicitation materials, in D.06-05-039. As ordered by D.06-05-039, on June 9, 2006 SCE filed and served its amended 2006 Plan. After the Director of the Energy Division temporarily suspended SCE's 2006 RPS solicitation and authorized SCE to further amend its 2006 Plan and 2006 RFP, SCE filed an amended 2006 RPS procurement plan and amended

²⁰ Pub. Util. Code, Section §399.14

2006 RFP protocol. In the amended 2006 Plan, SCE made the necessary changes that were required and/or suggested by D.06-05-039. The Proposed PPAs are consistent with SCE's Commission-approved RPS Plan.²¹

PPAs fit with Plan's identified renewable resource needs

SCE's 2006 RPS Plan called for SCE to issue competitive solicitations for electric energy generated by eligible renewable resources from either existing or new generating facilities that would deliver in the near term or long term. SCE also considered any new or repowered facilities that operate on co-fired fuels or a mix of fuels that include fossil fuel hybrid. SCE's 2006 request for proposals (RFP) solicited proposals for projects that would supply electric energy, environmental attributes, capacity attributes and resource adequacy benefits from eligible renewable energy resources. SCE requested proposals based upon standard term lengths of 10, 15 or 20 years with a minimum capacity of 1 MW. SCE indicated a preference to take delivery of the electric energy at SP-15, but considered proposals based upon any designated delivery point within California.

Both the Dixie Valley and ORNI 18 projects fit SCE's identified renewable resource needs. Both projects convey electric energy, environmental attributes, capacity attributes and resource adequacy to SCE. ORNI 18 satisfies both SCE's locational preference and delivery requirements. Additionally, Dixie Valley satisfies SCE's delivery requirements for a facility located outside of California.

PPA selections are consistent with RPS Solicitation Protocol

SCE distributed an RFP package that included a procurement protocol, which set forth the terms and conditions of the RFP, requirements for proposals, selection procedures, approval procedures and the RFP schedule. As part of the bid submission, SCE required bidders to submit comments on SCE's pro-forma agreement, to execute non-disclosure agreements and to send a letter stating that the bidder agrees to be bound by the terms and conditions of the protocol. The protocol also requested that proposals contain complete, accurate, and timely information about the project's supplier, generating facility, and commercial terms and the pricing details of the proposal.

According to SCE, the Dixie Valley and ORNI 18 bids were consistent with SCE's RPS solicitation protocol. Both bids offered power from eligible renewable energy resources, submitted the standard forms, agreed to be bound by the protocol and signed a non-disclosure agreement.

²¹ Modifications to SCE's pro-forma contract terms and conditions were required to comply with D.07-11-025.

Bid evaluation process consistent with Least-Cost Best-Fit (LCBF) decision

The CPUC's LCBF decision²² directs the utilities to use certain criteria in their bid ranking. It offers guidance regarding the process by which the utility ranks bids in order to select or "shortlist" the bids with which it will commence serious negotiations.

SCE's LCBF bid review process used for its 2006 solicitation is in compliance with the applicable Commission decisions. SCE's LCBF analysis evaluates both quantitative and qualitative aspects of each proposal to estimate its value to SCE's customers and relative value in comparison to other proposals.

Quantitative Assessment

SCE quantitatively evaluates bids based on individual benefit-to-cost (B-C) ratios. It is this B-C ratio that is used to rank and compare each project. The B-C ratios measure total benefits divided by total costs according to the following equation:

$$\text{B-C Ratio} = \frac{\text{Capacity Benefit} + \text{Energy Benefit}}{\text{Payments} + \text{Integration Cost} + \text{Transmission Cost} + \text{Debt Equivalence}}$$

The capacity benefits are assigned based on SCE's forecast of capacity value and a technology-specific effective load carrying capability (ELCC). SCE evaluates the project energy benefits using a production simulation model that compares the total production costs of SCE's base resource portfolio with the total production costs of the portfolio including the proposed RPS project. This calculation takes into account forecasted congestion charges, dispatchability and curtailability. This modeling methodology evaluates the impact of portfolio fit for all projects.

The market valuation of each project includes an assessment of the payments, an all-in price for delivered energy adjusted in each time-of-delivery period, and integration costs. By Commission policy (D.04-07-029 and clarified by D.07-02-011), integration cost adders for all proposals must be zero. Further, the transmission upgrade costs are estimated using SCE's transmission ranking cost report for resources that do not have an existing interconnection to the electric system or a completed Facilities Study.

The benefit-to-cost ratios for both the Dixie Valley and ORNI 18 projects were favorable in comparison to the bids in SCE's 2006 solicitations. See Confidential Appendix A for more detailed bid comparisons.

²² D.04-07-029

Independent evaluators (IE) oversaw SCE's RPS procurement process

Consistent with D.06-05-039, SCE retained an independent evaluator (IE), Sedway Consulting, to report to SCE's procurement review group about the 2006 RPS solicitation, to ensure that the solicitation was conducted fairly and to evaluate whether the best resources were acquired. According to the IE Report submitted in AL 2137-E-A, Sedway Consulting performed its duties overseeing the 2006 solicitation and has provided assessment reports to the PRG and the CPUC.

In its Independent Evaluator Report, Sedway Consulting concluded that SCE "conducted a fair and effective evaluation of the proposals that it received in response to its 2006 RPS RFP and made the correct selection decisions in its short list." Sedway Consulting performed its own evaluation of all 2006 proposals using a model developed to simulate SCE's LCBF ranking results. The IE ranked all proposals using its model and compared the results to SCE's bid ranking results. The IE's ranking results were similar to SCE's, and as a result, Sedway Consulting agreed with SCE's shortlisting decisions. In addition, the IE monitored SCE's shortlisting discussions, contract negotiations and meetings with management where SCE made decisions, for example, regarding bid prioritizations and negotiation positions. Overall, the IE concludes that SCE conducted a fair and effective evaluation of its 2006 renewable energy proposals.

For the IE's contract-specific evaluations, see Confidential Appendix E.

Consistency with adopted standard terms and conditions

In D.04-06-014, the Commission set forth standard terms and conditions (STCs) to be incorporated into RPS agreements. Appendix A of that decision identified nine of the fourteen STCs as "may not be modified." On November 19, 2007, after the filing of AL 2137-E and AL 2137-E-A, the Commission decided to grant, in part, an amended petition for modification of D.04-06-014. This decision, D.07-11-025, which granted in part the petition for modification, stated that all renewable power purchase agreements must contain four non-modifiable standard terms and conditions. D.07-11-025 also required that electrical corporations, such as SCE, file amendments to any pending advice letters for renewable PPAs in order to comply with the decision.

SCE filed AL 2137-E-B to supplement, in part, terms and conditions in both the Dixie Valley and ORNI 18 Agreements. As a result, the STCs for both PPAs are in compliance with D.07-11-025.

Contract prices are below 2006 MPR

The levelized contract price for the ORNI 18 contract does not exceed the relevant 2006 MPR. For the Dixie Valley contract, SCE had to modify the 2006 MPR model since it only calculated values for generating facilities with online dates between 2006 and 2015. SCE modified the 2006 MPR model, issued in Resolution E-4049, by extrapolating forward the data available in the 2006 MPR model in order to calculate an MPR for a facility with a 2018 online date. The Energy Division has reviewed the revised MPR model and finds the modifications to be reasonable. Using the modified model, SCE calculated the MPR for a 20-year contract with an online date in 2018 as \$101.95/MWh. Therefore, the levelized contract price for the Dixie Valley contract does not exceed the MPR.²³

As a result, the net present value of the sum of payments to be made under each PPA are less than the net present value of payments that would be made at the market price referent for the anticipated delivery. Therefore, for each contract, the contract price payments are below the MPR and per se reasonable as measured according to the net present value calculations explained in D.04-06-015, D.04-07-029, and D.05-12-042.

PPAs are viable projects

SCE believes that both projects are viable. However, ORNI 18's project viability is affected by the uncertainty surrounding whether the federal production tax credit will be extended past 2008.

Project Milestones

The ORNI 18 PPA identifies the necessary milestones, including permit applications, financing, construction and startup deadlines. Since the Dixie Valley PPA concerns an existing facility, there is no development necessary prior to delivery or any associated milestones.

Financeability of Resource

Both projects have financing in place.

D. 04-07-029

December 31, 2008, and ORNI 18's initial online date is December 2009. The PTC has been extended several times in recent history, and there is potential that it will again be extended. However, this poses a project viability concern for the ORNI 18 project since it is uncertain whether the PTC will be extended.

Sponsor's Creditworthiness and Experience

Both developers have been providing SCE with renewable energy for many years. According to SCE, they are both reliable and experienced.

Transmission Upgrades

The Dixie Valley project is operating and has no transmission upgrade issues. The ORNI 18 project will interconnect to the Imperial Irrigation District. While a new substation must be built and transmission upgrade studies are not yet complete, the developer has indicated a low risk that transmission upgrades will delay the project's online date. Initially, the ORNI 18 project will not be scheduled to deliver the energy to SCE's service territory because transmission upgrades are necessary to transmit the energy from IID to SCE's territory. However, because the RPS program allows the RPS-eligible energy to be delivered anywhere in California, SCE can remarket the energy until the necessary transmission upgrades are completed.²⁴

Fuel/Technology

The Dixie Valley project is online and reliably delivering geothermal energy. While the resource has been delivering for nearly 20 years, SCE believes that the geothermal resource will remain viable and will deliver the expected energy throughout the term of the contract.

SCE has reviewed the ORNI 18 resource test well results and spoke with the developer's geotechnical and drilling staff about the potential of the geothermal resource. As a result, SCE believes that the ORNI 18 project's geothermal resource will be able to sustain at least a 50 MW facility, and likely provide adequate supply for a 100 MW facility. Thus, there is an identifiable, yet low, risk that ORNI 18's untapped geothermal resource will affect the project's viability.

Confidential information about the contracts should remain confidential

Certain contract details were filed by SCE under confidential seal. Energy Division recommends that certain material filed under seal pursuant to Public Utilities (Pub. Util.) Code Section 583 and General Order (G.O.) 66-C, and

²⁴ D. 06-05-039, Conclusion of Law #3, allows delivery of RPS-eligible energy anywhere in California.

considered for possible disclosure, should be kept confidential to ensure that market sensitive data does not influence the behavior of bidders in future RPS solicitations.

COMMENTS

Public Utilities Code section 311(g)(1) provides that this resolution must be served on all parties and subject to at least 30 days public review and comment prior to a vote of the Commission. Section 311(g)(2) provides that this 30-day period may be reduced or waived upon the stipulation of all parties in the proceeding.

The 30-day comment period for the draft of this resolution was neither waived nor reduced. Accordingly, this draft resolution was mailed to parties for comments and will be placed on the Commission's agenda no earlier than 30 days from today.

FINDINGS OF FACT

1. The RPS Program requires each utility, including SCE, to increase the amount of renewable energy in its portfolio to 20 percent by 2010, increasing by a minimum of one percent per year.
2. D.04-06-014 set forth standard terms and conditions to be incorporated into RPS power purchase agreements.
3. D.07-11-025 granted an amended petition for modification of D.04-06-014, and set forth four non-modifiable standard terms and conditions to be incorporated into RPS power purchase agreements.
4. D.06-05-039 directed the utilities to issue their 2006 renewable RFOs, consistent with their renewable procurement plans.
5. The Commission required each utility to establish a Procurement Review Group (PRG) to review the utilities' interim procurement needs and strategy, proposed procurement process, and selected contracts.
6. Levelized contract prices below the 2006 MPR are considered *per se* reasonable as measured according to the net present value calculations explained in D.04-06-015, D.04-07-029, and D.05-12-042.

9. SCE filed Supplemental Advice Letter 2137-E-B on January 10, 2008 to supplement, in part, AL 2137-E and AL 2137-E-A to amend contract terms and conditions in both Caithness Dixie Valley and ORNI #18 contracts in order to comply with D.07-11-025.
10. SCE briefed its PRG on December 19, 2006 and March 13, 2007 on issues related to its 2006 shortlist and RFO. Also, on April 11, 2007 and June 27, 2007, SCE briefed the PRG concerning the successful conclusion of discussions with Dixie Valley and ORNI #18.
11. The proposed contract price for the ORNI 18 project is below the 2006 MPR released in Resolution E-4049.
12. SCE modified the 2006 MPR model in order to be able to evaluate a contract with a start date in 2018.
13. The Caithness Dixie Valley contract price is below the 2006 MPR modified by SCE.

CONCLUSIONS OF LAW

1. The Commission has reviewed the proposed contracts and finds them to be consistent with SCE's approved 2006 renewable procurement plan.
2. These Agreements are reasonable and should be approved in their entirety.
3. The costs of the contracts between SCE and Sellers are reasonable and in the public interest; accordingly, the payments to be made by SCE are fully recoverable in rates over the life of each project, subject to CPUC review of SCE's administration of the PPAs.
4. Certain material filed under seal pursuant to Public Utilities (Pub. Util.) Code Section 583 and General Order (G.O.) 66-C, and considered for possible disclosure, should not be disclosed. Accordingly, the confidential appendices, marked "[REDACTED]" in the redacted copy, should not be made public upon Commission approval of this resolution.
5. Procurement pursuant to these Agreements is procurement from eligible renewable energy resources for purposes of determining Buyer's compliance with any obligation that it may have to procure eligible renewable energy resources pursuant to the California Renewables Portfolio Standard (Public Utilities Code Section 399.11 *et seq.*), Decision 03-06-071, or other applicable law.
6. All procurement under the Dixie Valley and ORNI #18 Contracts count, in full and without condition, towards any annual procurement target established by the RPS Legislation or the Commission which is applicable to SCE.

Resolution E-4126
SCE AL 2137-E/SMK

7. All procurement under the Dixie Valley and ORNI #18 Contracts count, in full and without condition, towards any incremental procurement target established by the RPS Legislation or the Commission which is applicable to SCE.
8. A finding that all procurement under the Dixie Valley and ORNI #18 Contracts count, in full and without condition, towards the requirement in the RPS Legislation that SCE procure 20% (or such other percentage as may be established by law) of its retail sales from ERRs by 2010 (or such other date as may be established by law).
9. Any indirect costs of renewables procurement identified in Section 399.15(a)(2) shall be recovered in rates.
10. AL 2137-E, A1 2173-E-A and A1 2173-E-B should be approved without modifications.

THEREFORE IT IS ORDERED THAT:

1. Advice Letters (AL) 2137-E, 2137-E-A and 2137-E-B are approved without modifications.
2. The costs of the contracts between SCE and Sellers are reasonable and in the public interest; accordingly, the payments to be made by SCE, at or below the MPR, are fully recoverable in rates over the life of the project, subject to CPUC review of SCE's administration of the PPAs.
3. This Resolution is effective today.

Resolution E-4126
SCE AL 2137-E/SMK

I certify that the foregoing resolution was duly introduced, passed and adopted at a conference of the Public Utilities Commission of the State of California held on March 13, 2008; the following Commissioners voting favorably thereon:

/s/PAUL CLANON
PAUL CLANON
Executive Director

MICHAEL R. PEEVEY
PRESIDENT
DIAN M. GRUENEICH
JOHN A. BOHN
RACHELLE B. CHONG
TIMOTHY ALAN SIMON
Commissioners

Confidential Appendix A
Overview of 2006 Solicitation Bids
[REDACTED]

Confidential Appendix B
LCBF Bid Evaluations
[REDACTED]

Confidential Appendix C-1
Contract Summary: Caithness Dixie Valley
[REDACTED]

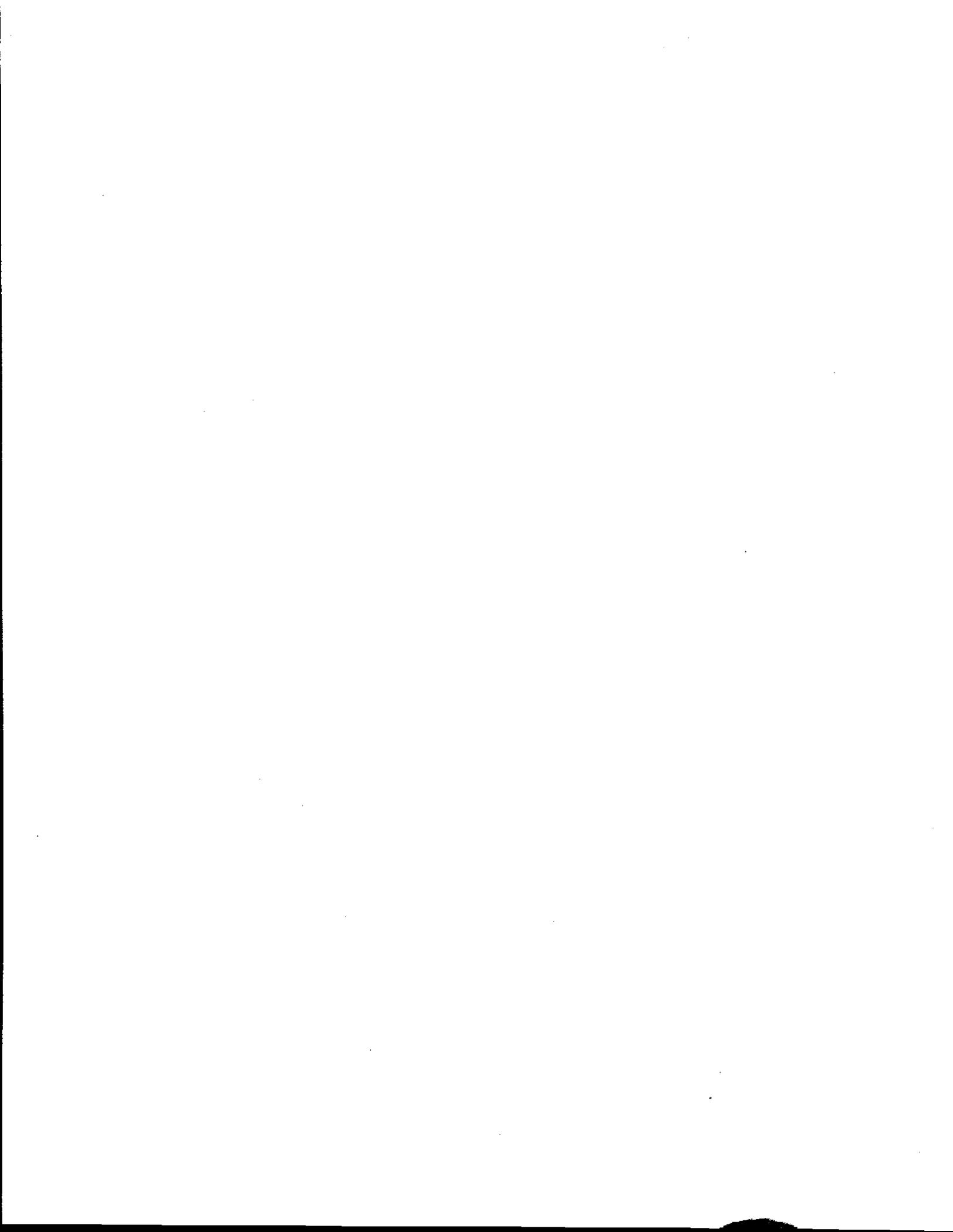
Confidential Appendix C-2
Contract Summary: ORNI #18
[REDACTED]

Confidential Appendix E:
Independent Evaluator's
Contract-Specific Assessments
(Dixie Valley and ORNI 18)
[REDACTED]

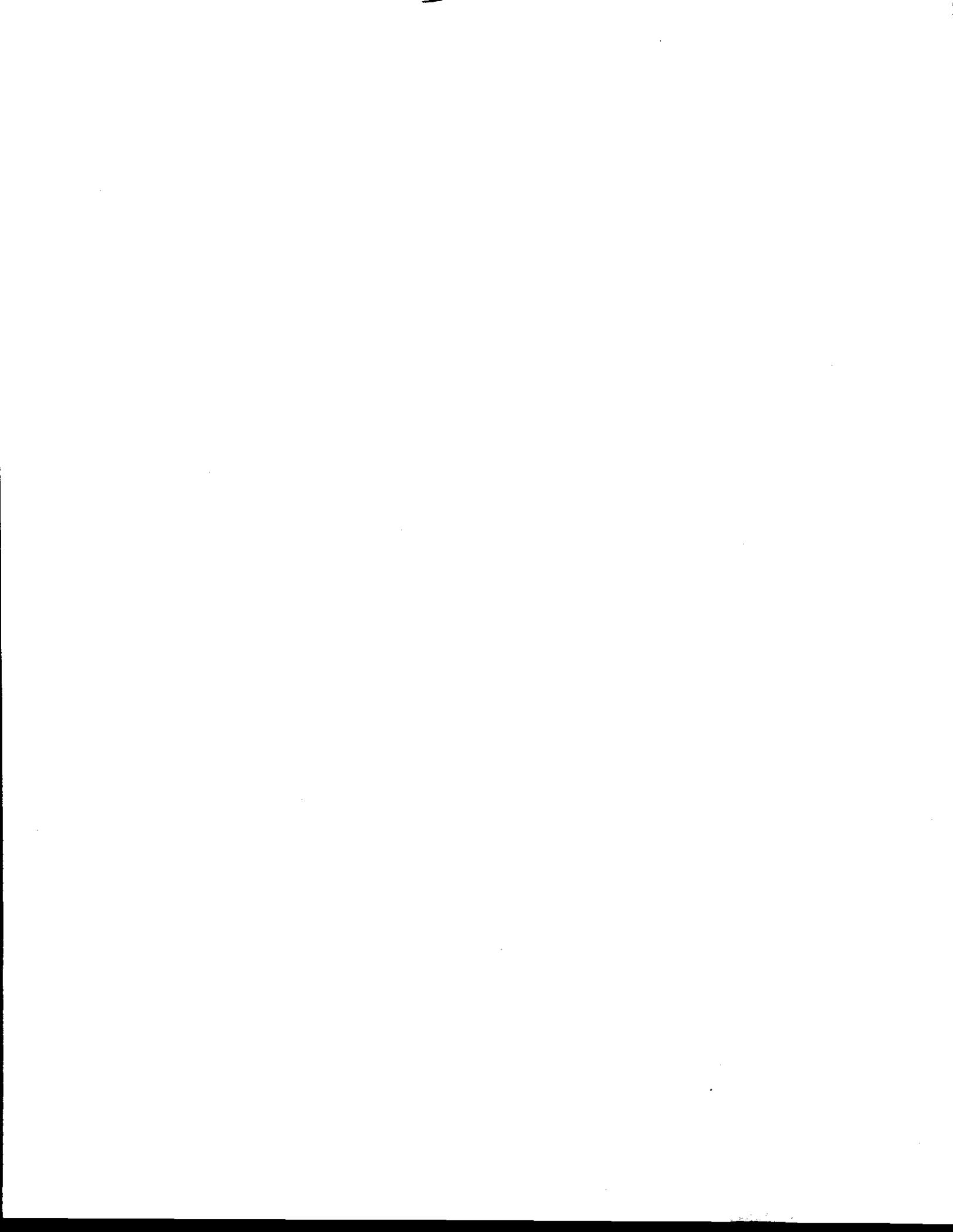
Confidential Appendix F-1:
Project's Contribution Toward RPS Goals -
Caithness Dixie Valley
[REDACTED]

Confidential Appendix F-2:
Project's Contribution Toward RPS Goals -
ORNI #18
[REDACTED]

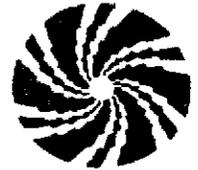
Attachment D



Attachment D



ORMAT®



September 14, 2010

Mr. Brad Poiriez
Air Pollution Control Officer
Imperial County Air Pollution Control District
150 S. 9th Street
El Centro, CA 92243

Subject: Revised Application for Authority to Construct for the East Brawley Geothermal Development Project

Dear Mr. Poiriez:

ORNI 19, LLC, a wholly owned subsidiary of Ormat Nevada Inc., is proposing the East Brawley Geothermal Development Project (Project or Facility), consisting of a new 49.9 MW (net) binary power plant; a geothermal well field (owned by ORNI 17, LLC and ORNI 19, LLC), consisting of a total of 34 geothermal wells; pipelines to bring the geothermal fluids produced from the production wells to the power plant and spent geothermal fluids to the injection wells for injection into the geothermal reservoir; an interconnection transmission line to the Imperial Irrigation District's existing electrical transmission system; and a water conveyance system to bring water to the power plant to provide cooling water for the power plant.

The Project is located east of the New River, and north-northeast of the City of Brawley in Imperial County, California. The approximately 15 acre power plant site (which includes the substation and storm water retention basin) is located on private agriculture lands northwest of the intersection of Best and Ward Roads, in the southeast quarter of Section 15, Township 13 South, Range 14 East, SBB&M, identified as Assessor's Parcel Number (APN) 037-140-06-01, a parcel of 32.81 acres. The geothermal well field is also located on private agricultural lands in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, SBB&M.

Ormat anticipates that construction on the project would start during the fourth quarter of 2010, with commercial start-up in late-2011.

The enclosed application replaces the Authority to Construct application originally submitted for this project on October 31, 2008 and determined complete by the ICAPCD on December 2, 2008. It consists of the completed Authority to Construct Application form; two supplemental Internal Combustion Engine Summary forms for the two emergency engines; and an attachment to the ATC Application form which provides a complete description of the proposed project, projected air pollutant emission rates, an assessment of project compliance with the ICAPCD regulations, and a health risk assessment for the noncondensable gases emitted by the scrubber. We understand that the check for the \$157.00 application processing fee submitted with the original application in 2008 will be applied to this application. If this is not correct, please let us know and we will replace or supplement this check as appropriate.

We understand that pursuant to District Rule 902, a synthetic minor permit requires a 30-day public notice and a 30-day review by the U.S. Environmental Protection Agency. We ask that the District schedule these two reviews to run concurrently, and take whatever additional steps may be possible to facilitate the timely review and approval of this permit application so that the construction of the modified facility can be initiated as soon as Imperial County approved the Conditional Use Permit for the project.

ORMAT Nevada

6225 Neil Road, Reno, NV, 89511-1163 • Telephone (775) 356-9029 • Facsimile (775) 356-9039

ORMAT®



775-336-0173

Please call me at ~~760.351.8555~~ if you have any questions or need more information. We would also be happy to meet with you and your staff to review any aspect of the project.

Sincerely,

rleiken@ormat.com

Ron Leiken, QEP
Environmental/Regulatory Affairs Administrator

Enclosures (5)

cc: Dwight Carey, EMA (w/ Enclosures)
David Levy, Ormat Nevada Inc. (w/ Enclosures)

ORMAT Nevada

6225 Neil Road, Reno, NV, 89511-1163 • Telephone (775) 356-9029 • Facsimile (775) 356-9039

150 South Ninth Street
El Centro, CA 92243
(760) 482-4606

IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT



RECEIVED
 SEP 16 2010
 Emission Credit Banking \$85.00
 Change of Permit Conditions
 Air Pollution Control District

APPLICATION FOR

- Authority to Construction
 New
 Amendment
 Permit to Operate
 Transfer of Ownership
 Relocation
 Name change

PERMIT NUMBER (if any) N/A

1. Name of Applicant ORNI 19, LLC - ORMAT NEVADA, INC.
 2. Responsible Person David Levy
 3. Mailing Address 6225 Neil Road
 4. Title Project Manager
 5. City Reno State NV Zip Code 89511-1153
 6. Phone (Area Code) 760.351.8555 Cell Phone (Area Code) 775.376.2023
 7. Type of Organization (Corp., Government, Individual, etc.)
Limited Liability Corporation - Corporation
 8. Brief Description of Project/Activity
East Brawley Geothermal Development Project-49.9 MW (net) binary power plant and geothermal well field
 9. Location of Project/Activity
North-northeast of the City of Brawley - Sections 10, 11, 14, 15, 16, 21, 22, and 23, T135, R14E, SBB&M
 10. Property Owner
ORNI 19, LLC (power plant site in Section 15)
 11. Person in Charge at Location David Levy
 12. Title Project Manager
 13. Phone Number (Area Code) 775.376.2023
 14. Anticipated Date of Construction
 Start Spring 2011
 Completion Spring 2012
 15. Anticipated Life of Project 30+ years
 16. Estimated Emissions

	Uncontrolled lbs/day	Controlled lbs/day
For largest single pollutant <u>ROC</u>	<u>416.76</u>	<u>154.31</u>
Total for all emissions <u>H25/PM10/CO/NOx</u>	<u>72.62/124.31/4.41/7.14</u>	<u>3.93/136.31/4.41/29.89</u>

 17. Other Permits Have Been or Will be Obtained From:
ICPDS, ICPWD, CRWQCB, IID, ICDHS-EH5, CDTSC, Caltrans, CSWRCB
 18. Plot plans, flow charts, calculations, equipment description and other information required by "List and Criteria" attached.
 19. The information previously submitted with _____ is still valid and no changes have been made except as shown on attachment.
 20. Request for confidential handling of attached.
 21. Total pages attached 89

"I am familiar with the Rules and Regulations of the Imperial County Air Pollution Control District and I certify that the operation of the plant and/or equipment which is subject to the application will comply with said Rules and Regulations."

9/15/10
Date

D. Levy
Signature of Responsible Person

OFFICE USE ONLY: All payments must be made by Check or Money Order. Cash will not be accepted Thank you.
 Note: An application fee of \$157.00 is due upon submission of an application.

Date application submitted: _____ Amount paid: _____
 Received by: _____ Receipt Number: _____
 Staff Comments: _____

ATTACHMENT 1
REVISED APPLICATION FOR AUTHORITY TO CONSTRUCT
ORNI 19, LLC – ORMAT NEVADA, INC.
EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT

ATTACHMENT 1
REVISED APPLICATION FOR AUTHORITY TO CONSTRUCT
ORNI 19, LLC – ORMAT NEVADA, INC.
EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT

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SYSTEM



INTERNAL COMBUSTION ENGINE SUMMARY FORM

Page 1 of 2

NOTICE

An application will not be processed unless ALL fields in "Section A" are complete.

Section A

Company/Agency ORNI 19, LLC - ORMAT NEVADA, INC.	Phone Number 760.351.8555
Equipment Location Section 15, Township 13 South, Range 14 East, 5BB&M.	Existing Permit # (if any) N/A
Engine Manufacturer Caterpillar	Model Number C15
Engine Serial Number: FSE02024	EPA/C.A.R.B. 12-character Engine Family Name 7CPXL15.2E5K
Manufacturer Date: Model Year 2007	Is unit equipped with a non-resettable hour meter? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Utilization of Engine	
<input checked="" type="checkbox"/> Electrical Generator 535 Kw	<input type="checkbox"/> Fire Pump <input type="checkbox"/> Portable
<input type="checkbox"/> Compressor Driver _____ cfm	<input type="checkbox"/> Other _____
<input type="checkbox"/> Pump Driver _____ gpm	<input type="checkbox"/> Rental _____
Fuel Information	
<input type="checkbox"/> Natural Gas <input type="checkbox"/> Gasoline <input type="checkbox"/> LPG _____	<input type="checkbox"/> Other _____
<input type="checkbox"/> Digester Gas <input type="checkbox"/> Landfill Gas <input checked="" type="checkbox"/> Diesel Oil	
Engine Size (Manufacturers Rating) BHP@ 717	RPM 1800
Operating Schedule	
1 Hr/Days _____ Days/Week	
_____ Weeks/Year Maximum Operating Hours 50 hrs _____ Hrs/Days	
<input checked="" type="checkbox"/> Emergency Only (indicate hours operated for testing & maintenance)	

Section B

Is this unit designed to be moved or carried from one location to another, or does it have wheels, skids, <input type="checkbox"/> Yes (Portable) <input checked="" type="checkbox"/> No (Stationary)
--



INTERNAL COMBUSTION ENGINE SUMMARY FORM

Section C

Engine Description		Number of Cylinders: _____	
<input type="checkbox"/> Two Cycle	or	<input checked="" type="checkbox"/> Four Cycle	
<input type="checkbox"/> Lean Burn	or	<input type="checkbox"/> Rich Burn	
<input type="checkbox"/> Turbocharged	<input checked="" type="checkbox"/> Turbocharged/Aftercooled	<input type="checkbox"/> Naturally Aspirated	
Sulfur Content of Disgester Gas, Landfill Gas or Diesel			
CARB Diesel			
Maximum Rated Fuel Consumption (Gas/Hr, Cu. Ft/Hr) 241.7 lbs/hr			
Average Load Percentage %			
Energy Recovery From Exhaust		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No If yes, please explain
Emission Control Device		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No If yes, please explain
Emission Data:			
POLLUTANT	EMISSION BEFORE CONTROL Gr/BHP PPM Lb/Day		EMISSION AFTER CONTROL Gr/BHP PPM Lb/Day
NMHC or TOC	CARB Tier 3 Standard = NMHC+NOx=4 g/kWhr		
NOx	CARB Tier 3 Standard = NMHC+NOx=4 g/kWhr		
CO	CARB Tier 3 Standard = 3.5 g/kWhr		
PM10	CARB Tier 3 Standard = 0.20 g/kWhr		
SOx	0.0074 g/kWhr		
		<input checked="" type="checkbox"/> Manufacturer Data	<input type="checkbox"/> Source Test Data

Section D

Stationary Engines Only			
Stack Dimensions			
Height Above Grade	Approx. 10 Ft	Height Above Building	N/A Ft
Exhaust Cross Section			
Diameter	8 In	Width	N/A In
		Length	N/A In
Exhaust Temperature	942 °F	Direction of Stack Outlet	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical
			<input type="checkbox"/> Other
End of the Stack	<input type="checkbox"/> Open <input type="checkbox"/> Capped	<input checked="" type="checkbox"/> Flapper Valve	
Stack Serves			
<input checked="" type="checkbox"/> Only this equipment	Exhaust Flow	3.845	CFM
<input type="checkbox"/> Other equipment also	Total Flow Rate	3.845	CFM
	Exhaust Pressure	0 psig	CFM
Receptor Information. A receptor is a residence or business whose occupants could be exposed to toxic emissions from your facility.			
Nearest offsite receptor <u>Home</u>			
Distance to nearest offsite receptor	2,000	feet	
Distance to nearest school grounds	10,000	feet	

Dwight L. Carey
 Name of preparer

10/30/08
 Date



INTERNAL COMBUSTION ENGINE SUMMARY FORM

Page 1 of 2

NOTICE

An application will not be processed unless ALL fields in "Section A" are complete.

Section A

Company/Agency ORNI 19, LLC - ORMAT NEVADA, INC.		Phone Number 760.351.8555	
Equipment Location Section 15, Township 13 South, Range 14 East, 5BB&M.		Existing Permit # (if any) N/A	
Engine Manufacturer Cummings		Model Number CFP83-F40	
Engine Serial Number: 8728-6CTAAG3		EPA/C.A.R.B. 12-character Engine Family Name Not Available	
Manufacturer Date: Model Year 2007		Is unit equipped with a non-resettable hour meter? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Utilization of Engine			
<input type="checkbox"/> Electrical Generator	<u>215</u> Kw	<input checked="" type="checkbox"/> Fire Pump	<input type="checkbox"/> Portable
<input type="checkbox"/> Compressor Driver	_____ cfm	<input type="checkbox"/> Rental	<input type="checkbox"/> Other _____
<input type="checkbox"/> Pump Driver	_____ gpm		
Fuel Information			
<input type="checkbox"/> Natural Gas	<input type="checkbox"/> Gasoline	<input type="checkbox"/> LPG	<input type="checkbox"/> Other _____
<input type="checkbox"/> Digester Gas	<input type="checkbox"/> Landfill Gas	<input checked="" type="checkbox"/> Diesel Oil	
Engine Size (Manufacturers Rating)		BHP@ 288	RPM 1760
Operating Schedule			
<u>1</u>	Hr/Days	_____	Days/Week
	Weeks/Year	Maximum Operating Hours <u>50 hrs</u>	Hrs/Days
<input checked="" type="checkbox"/> Emergency Only (indicate hours operated for testing & maintenance)			

Section B

Is this unit designed to be moved or carried from one location to another, or does it have wheels, skids,
 Yes (Portable) No (Stationary)



INTERNAL COMBUSTION ENGINE SUMMARY FORM

Page 2 of 2

Section C

Engine Description		Number of Cylinders: _____	
<input type="checkbox"/> Two Cycle	or	<input checked="" type="checkbox"/> Four Cycle	
<input type="checkbox"/> Lean Burn	or	<input type="checkbox"/> Rich Burn	
<input type="checkbox"/> Turbocharged	<input checked="" type="checkbox"/> Turbocharged/Aftercooled	<input type="checkbox"/> Naturally Aspirated	
Sulfur Content of Disgester Gas, Landfill Gas or Diesel			
CARB Diesel			
Maximum Rated Fuel Consumption (Gas/Hr, Cu. Ft/Hr)			
14.5 gph			
Average Load Percentage %			
Energy Recovery From Exhaust		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No If yes, please explain
Emission Control Device		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No If yes, please explain
Emission Data:			
POLLUTANT	EMISSION BEFORE CONTROL Gr/BHP PPM Lb/Day		EMISSION AFTER CONTROL Gr/BHP PPM Lb/Day
NMHC or TOC	0.14 g/kWhr		
NOx	5.37 g/kWhr		
CO	0.6 g/kWhr		
PM10	0.09 g/kWhr		
SOx	0.0074 g/kWhr		
		<input checked="" type="checkbox"/> Manufacturer Data	<input type="checkbox"/> Source Test Data

Section D

Stationary Engines Only			
Stack Dimensions			
Height Above Grade	Approx. 8 Ft	Height Above Building	N/A Ft
Exhaust Cross Section			
Diameter	4 In	Width	N/A In
		Length	N/A In
Exhaust Temperature	952 °F	Direction of Stack Outlet	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical
			<input type="checkbox"/> Other
End of the Stack	<input type="checkbox"/> Open <input type="checkbox"/> Capped	<input checked="" type="checkbox"/> Flapper Valve	
Stack Serves			
<input checked="" type="checkbox"/> Only this equipment	Exhaust Flow	1.632	CFM
<input type="checkbox"/> Other equipment also	Total Flow Rate	1.632	CFM
	Exhaust Pressure	0 psig	CFM
Receptor Information. A receptor is a residence or business whose occupants could be exposed to toxic emissions from your facility.			
Nearest offsite receptor Home			
Distance to nearest offsite receptor	2,000	feet	
Distance to nearest school grounds	10,000	feet	

Dwight L. Carey
 Name of preparer

10/30/08 - rev 9/14/10
 Date

ATTACHMENT 1
REVISED APPLICATION FOR AUTHORITY TO CONSTRUCT
ORNI 19, LLC – ORMAT NEVADA, INC.
EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT

INTRODUCTION

ORNI 19, LLC, a wholly owned subsidiary of Ormat Nevada, Inc., (Ormat) is proposing the East Brawley Geothermal Development Project (Project or Facility), consisting of a new 49.9 MW (net) binary power plant; a geothermal well field (owned by ORNI 17, LLC and ORNI 19, LLC), consisting of a total of 34 geothermal wells; pipelines to bring the geothermal fluids produced from the production wells to the power plant and spent (cooled) geothermal fluids to the injection wells for injection into the geothermal reservoir; an interconnection transmission line to the Imperial Irrigation District's existing electrical transmission system; and a system to bring water to the power plant to provide cooling water for the power plant.

The Project is located east of the New River, and north-northeast of the City of Brawley in Imperial County, California (see Figure 1). The approximately 15 acre power plant site (which includes the substation and storm water retention basin) is located on private agriculture lands northwest of the intersection of Best and Ward Roads, in the southeast quarter of Section 15, Township 13 South, Range 14 East, SBB&M, identified as Assessor's Parcel Number (APN) 037-140-06-01, a parcel of 32.81 acres. The geothermal well field is also located on private agricultural lands in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, SBB&M (see Figure 2).

Ormat anticipates that construction on the project would start during the fourth quarter of 2010, with commercial start-up in late-2011.

The Project will be similar to the North Brawley geothermal power plant, which is currently completing startup approximately 1.75 miles to the west under Authority to Construct No. 3731A. As a result, this application follows the format of the Application for Amendment to Authority to Construct No. 3731, submitted August 11, 2008 by ORNI 18, LLC and Ormat Nevada, Inc. The well field for the East Brawley Project has filed a separate application for an amendment to Authority to Construct No. 3783 to drill and test the wells required for the East Brawley Project.

East Brawley Geothermal Development Project – Attachment I
Revised Application for Authority to Construct

- two 12,000 gallon motive fluid (isopentane) storage tanks;
 - integrated OEC Unit motive fluid (isopentane) vapor recovery systems on each OEC Unit condenser (manufactured by Ormat Turbines Ltd.);
 - a maintenance vapor recovery unit, consisting of a diaphragm pump, a vacuum pump, and activated carbon canisters (manufactured by Ormat Turbines Ltd.);
 - two film, counter-flow, induced-draft cooling towers (each with seven to ten cells), each circulating a maximum of 110,000 gpm of cooling water;
 - two to four cooling water blowdown injection wells;
 - a regenerative thermal oxidizer (RTO) unit (for the abatement of benzene and hydrogen sulfide in the emitted geothermal noncondensable gases) and caustic scrubber abatement system (for the abatement of sulfur oxides from the RTO oxidization of the hydrogen sulfide in the geothermal noncondensable gases);
 - a control room, office, and maintenance shop;
 - an electrical substation;
 - a 215 kW emergency standby diesel engine fire-water pump (manufactured by Daybreak Technologies, Inc.);
 - a 625 kVA/535 kW emergency standby diesel engine-generator to supply electrical power for plant auxiliaries when the plant trips (manufactured by Hawthorn Power Systems); and
 - other related ancillary equipment.
- a geothermal well field, consisting of a total of 34 geothermal wells:
 - Approximately 17 geothermal fluid production wells, each about 4,500 feet deep, with associated electrically powered pumps, well pad piping, sand separators to remove sand from the produced geothermal fluid, electrical power supply, geothermal noncondensable gas separators and related ancillary equipment (tanks, valves, controls, and flow monitoring devices), and
 - Approximately 17 geothermal fluid injection wells, each about 4,500 feet deep, with associated well pad piping, a geothermal fluid filter system, electrical power supply and related ancillary equipment (tanks, valves, controls, and flow monitoring devices);
 - pipelines to bring the geothermal fluids produced from the production wells to sand separators and the power plant, and the spent geothermal fluids to the injection fluid filter system and the injection wells for injection into the geothermal reservoir;
 - pipelines to bring the separated noncondensable gases produced from the production wells to the power plant for processing through the RTO unit and release to the atmosphere;
 - an approximately two-mile long 92 kv/13.8 kV transmission interconnection line to the North Brawley substation;
 - a communication tower on the plant site to facilitate communications with a central Ormat Imperial Valley control room; and
 - a water conveyance system to bring water to the power plant to provide cooling tower makeup water for the power plant.

East Brawley Geothermal Development Project – Attachment 1
Revised Application for Authority to Construct

The East Brawley Project consists of four principal systems: the geothermal fluid system, the motive fluid system, the cooling water system and the geothermal noncondensable gas system (including the regenerative thermal oxidizer (RTO) unit/caustic scrubber system and the cooling tower geothermal noncondensable gas bypass). Although the geothermal fluid system and the motive fluid system are each generally closed systems, each would emit small quantities of air contaminants during normal and maintenance operations. The cooling water system and the geothermal noncondensable gas system are at least partially open to the atmosphere.

Figure 3 shows the general arrangement of the Project power plant facilities. Figure 4 and Figure 5 are basic block diagrams of the power plant, which each shows how the three separate power plant fluid systems (geothermal fluid, motive (working) fluid and cooling water) flow through each of the six OEC Units. Figure 6 shows a perspective view of one of the six OEC Units. Each of the six OEC Units would be able to operate independently of the others, but would share common ancillary components (additional working fluid storage, geothermal fluid supply and injection, etc.). Figure 7 presents the simplified process flow diagram for the geothermal noncondensable gas (NCG) system, including the high pressure NCG separator, the RTO unit/caustic scrubber system and the cooling tower bypass. Figure 8 presents the RTO unit/caustic scrubber system general arrangement – plan and elevation views, while Figure 9 presents the RTO unit/caustic scrubber system mass flow diagram.

Geothermal resources required to provide heat energy to the power plant would be supplied from a total of approximately 17 geothermal production wells (see Figure 2). Each production well would be equipped with a pump driven by a vertical electric motor located on top of the well pump discharge head and corrosion and scale inhibitor systems to deliver corrosion and scale inhibitors into the geothermal fluid. An electric cable installed along the production pipeline from the power plant would provide the electricity to power the well pump motor.

Each of the production wells would deliver geothermal fluid to the power plant through production pipelines. The geothermal fluids would first flow from the production wells through closed, high pressure well pad separators which would separate most of the geothermal noncondensable gases from the geothermal brine (see Figure 7). If the quantity of geothermal noncondensable gases in the geothermal fluid is less than the high end of the possible range, all of these separated geothermal noncondensable gases would flow through other dedicated pipelines to the power plant site, to be dissolved/entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. Small quantities of these separated geothermal noncondensable gases would be discharged to the atmosphere along the dedicated pipelines as condensate created as the steam cools is drained from the pipeline.

However, if the quantity of geothermal noncondensable gases in the geothermal fluid is at the high end of the possible range, up to twenty-five percent of these separated geothermal noncondensable gases would flow through other dedicated pipelines to the RTO unit/caustic scrubber system located at the power plant site. The remaining seventy-five percent of the separated geothermal noncondensable gases would flow through the dedicated pipelines to be dissolved/entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. As described above, small quantities of these separated geothermal noncondensable gases

East Brawley Geothermal Development Project – Attachment 1
Revised Application for Authority to Construct

would be discharged to the atmosphere along the dedicated pipelines as condensate created as the steam cools is drained from the pipeline.

The geothermal brine and the geothermal noncondensable gases remaining in the geothermal brine would then flow through sand separators at each well pad to remove sand and other debris from the produced geothermal fluid. These sand separators would discharge a small amount of geothermal fluid and accompanying geothermal noncondensable gases when purging the sand. The produced geothermal fluid would then proceed through booster pumps and the geothermal fluid pipelines to the power plant site, through additional sand separators, then through the OEC units. The spent geothermal fluid would then run through an injection fluid filtrations system and into the geothermal injection wells without coming into direct contact with the motive fluid or the atmosphere. The geothermal injection fluid filtration system would also discharge a small amount of geothermal fluid and accompanying geothermal noncondensable gases when purging the filtered sand.

The produced geothermal fluid would flow through the level 1 and level 2 vaporizers and preheaters of each OEC Unit, transferring the heat to the motive (working) fluid through the OEC Unit shell-and-tube heat exchangers. Injection pumps located at the power plant site would pump the geothermal injection fluid through the injection pipeline system, providing sufficient pressure to inject the cooled geothermal fluid back into the geothermal reservoir through the approximately 17 injection wells.

The Project would use isopentane as the motive (working fluid). The pressure of the isopentane working fluid vaporized from each OEC Unit level 1 and level 2 vaporizers would turn each OEC Unit level 1 and level 2 turbine, which together would turn a common generator, which would produce the electrical energy which would be delivered to the existing IID electrical transmission systems through the North Brawley substation. The isopentane vapor exiting each turbine would be condensed back into a liquid in a shell-and-tube condenser and returned to the preheaters and vaporizers to repeat the essentially closed cycle.

Each OEC Unit would contain approximately 23,000 gallons of isopentane (in the vaporizers, preheaters, condensers and piping). Each OEC Unit would have minor leaks of isopentane from the valves, connections, seals, and tubes which would be released either to the atmosphere or into the geothermal fluid or circulating cooling water lines. Power plant operators would frequently inspect and monitor the OEC Units for isopentane leaks and visual signs of fugitive isopentane emissions.

Small amounts of air or water vapor typically leak into the OEC Unit isopentane system in the condensers and would eventually reduce the operating efficiency of the OEC Unit unless removed. In order to remove these noncondensable gases, each OEC condenser would have a small (~0.106 scf) "OEC vapor recovery unit" (OEC VRU) integrated into the condenser. Each OEC VRU would consist of two chambers and a set of isolation valves. Operation of each OEC VRU would be controlled by the power plant computer control system, which would start the OEC VRU noncondensable gas "purge" sequence whenever the efficiency of the OEC Unit fell below a set point. During "purging," nearly all of the isopentane vapors in the OEC VRU would be compressed into liquid isopentane and returned to the OEC Unit, while the noncondensable

East Brawley Geothermal Development Project – Attachment 1
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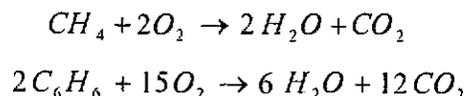
gases, together with a small quantity of isopentane vapors, would be discharged to the atmosphere.

Some OEC Unit major maintenance activities require that at least a portion of an OEC Unit be cleared of isopentane liquid and vapors prior to performing the maintenance activities. To control and minimize isopentane emissions during these infrequent major maintenance activities, the liquid isopentane would first be drained from the section of the OEC Unit (preheater, vaporizer or condenser) to be maintained or repaired and transferred to either another section of the OEC Unit, the isopentane storage tanks, or another OEC Unit. The Maintenance VRU diaphragm pump and vacuum pump would then be used to evacuate and compress most of the remaining isopentane vapors, returning the isopentane liquid to the other sections of the OEC Unit, the isopentane storage tanks, or another OEC Unit. Those isopentane vapors which do not condense would be released to the atmosphere through the Maintenance VRU activated carbon canisters, which would adsorb nearly all of the remaining isopentane vapors.

The shell-and-tube isopentane vapor condensers would be cooled by water circulated from the two cooling towers. Water from the condensers would be cooled in the cooling towers through evaporation of a portion of the circulating cooling water as the water falls through the air drawn into the cooling towers by the cooling tower fans atop each cooling tower cell. A much smaller portion of the circulating cooling water would also be lost as water droplets ("drift") through the top of the cooling tower cells. The cooling towers would be constructed with high efficiency drift eliminators to reduce the quantity of emitted drift. Some of the circulating cooling water would also be injected into the geothermal reservoir with the geothermal injection fluid or through one or more dedicated blowdown injection wells to remove dissolved salts which would be concentrated in the cooling water through the evaporation process. Water would be added to the cooling tower to make up for the water lost through evaporation, drift and blowdown.

The up-to-twenty-five percent of the geothermal noncondensable gases separated at each of the well pads would be delivered through dedicated noncondensable gas pipelines to the RTO unit/caustic scrubber system located at the power plant site (see Figure 7). The proposed RTO unit would receive the noncondensable gases from the noncondensable gas pipelines. These gases are expected to contain sufficient hydrocarbons and oxygen (with supplemental air and a small amount of propane) to support complete combustion once the RTO unit combustion chamber reached the design operating temperatures (about 1500°F). Propane would also be used to pre-heat the RTO unit during cold start-ups and supplement the heat values of the combustible gases.

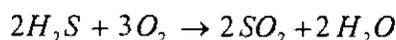
The RTO unit would oxidize the hydrocarbons in the NCGs and supplemental propane to carbon dioxide and water vapor in an exothermic process. Methane is the hydrocarbon in largest concentration in the noncondensable gas delivered to the RTO unit, with benzene being second. The following equations show the conversion of methane and benzene to water and carbon dioxide:



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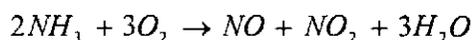
The RTO unit would combust and abate at least 98 percent of the benzene, methane and other hydrocarbons in the NCGs it receives. It is considered Best Available Control Technology (BACT) for the abatement of hydrocarbons and volatile organic gases in a wide variety of applications.

The RTO unit would also oxidize at least 98 percent of the hydrogen sulfide in the NCGs delivered to the RTO unit. The oxidation of hydrogen sulfide in the RTO unit would produce sulfur dioxide (SO₂) and water vapor in the following reaction:



The resulting SO₂ emissions would be controlled by the caustic scrubber (see below).

The low temperature combustion in the RTO unit, around 1500°F, is flameless and would thus not create appreciable nitrogen oxides (NO_x) from the oxidation of atmospheric nitrogen. The oxidation of essentially 100 percent of the ammonia contained in the NCGs by the RTO unit, however, would result in the formation of nitrogen oxides, in the following general reaction:



The RTO unit would oxidize the hydrocarbons in an average of about 5,600 standard cubic feet per minute (scfm) (28,100 lbs/hr) of NCGs using approximately 3,900 scfm (17,400 lbs/hr) of dilution air and up to 5.5 gallons (500,000 btu) per hour of propane. In the RTO unit the NCGs and dilution air enter the oxidation chamber through a hot, porous, ceramic heat-transfer media which heats the gas (see Figure 9). The heat generated by the oxidation of the NCGs and propane in the oxidization chamber sustains the oxidation process. These heated gases exit the oxidation chamber through a second porous, ceramic heat-transfer media which is heated by the exiting gases. Poppet control valves would reverse the direction of the gas flow at regular intervals to maintain an even distribution of temperatures between the two ceramic media.

The proposed caustic scrubber would receive the carbon dioxide, water vapor, sulfur dioxide, nitrogen oxides and other gases produced from the oxidation process in the RTO unit (as well as the gases passing through the RTO unit unoxidized). Before entering the caustic scrubber, the hot gases would be cooled through a direct contact quenching process. The quenched gases would then proceed to the caustic scrubber, where they would be subjected to counter-flows of caustic absorbate (water and sodium hydroxide). The caustic absorbate would react with the sulfur oxides in the quenched gases to produce sodium sulfates and sulfites, both water-soluble compounds that would be dissolved in the caustic scrubber water and piped to a storage sump at the bottom of the scrubber. The remaining gases from the RTO unit would be vented out the top of the caustic scrubber through a 30-foot tall stack. The small quantity of spent absorbate would be drained from the storage sump and piped to one of the cooling towers. Fresh absorbate would be added as needed to make up for the loss of exhausted absorbate. The caustic scrubber would remove at least 97.5 percent of the sulfur oxides in the gases it receives. It is considered BACT for the control of sulfur dioxide.

A control panel with a programmable logic controller would be used to provide monitoring and control of the RTO unit/caustic scrubber system. RTO unit/caustic scrubber system scheduled

East Brawley Geothermal Development Project – Attachment 1
Revised Application for Authority to Construct

maintenance would be coordinated with the maintenance schedule for the East Brawley power plant, such that the East Brawley power plant would operate no more than 276 hours per year without the RTO unit/caustic scrubber system. When the RTO unit/caustic scrubber system is undergoing unscheduled maintenance or otherwise not operating, the geothermal NCGs would bypass the RTO unit/caustic scrubber system and would be delivered to the cooling towers for release to the atmosphere unabated.

APPLICABLE REGULATIONS

The following Imperial County Air Pollution Control District (ICAPCD) regulations apply to the proposed Project.

Rule 201 Permits Required

Except as exempted, new or modified sources which may emit or control air contaminants must obtain written authorization from the ICAPCD prior to construction.

Rule 206 Processing of Applications

Rule 206.A.4.c provides that the Air Pollution Control Officer shall take reasonable steps to insure that no Project will emit air contaminants that may endanger the short or long term health, safety or property of Persons.

Rule 207 New and Modified Stationary Source Review

Rule 207 limits the permitted increases of air pollutants that could interfere with the attainment or maintenance of ambient air quality standards.

- Rule 207.C.1.a requires Best Available Control Technology (BACT) for equipment with the potential to emit 25 pounds per day or more of any nonattainment pollutant or its precursors. (Ozone and fine particulate matter (PM10) are nonattainment pollutants in Imperial County, and reactive organic compounds [ROCs, which are most hydrocarbons], nitrogen oxides [NOx] and sulfur oxides [SOx] are precursors to ozone [ROCs] and PM10 [ROCs, NOx and SOx].)
- Rule 207.C.1.c requires Best Available Control Technology (BACT) for equipment with the potential to emit 55 pounds per day or more of hydrogen sulfide or the potential to emit 550 pounds per day or more of carbon monoxide (CO) in attainment areas.
- Rule 207.C.2.a requires offsets for all emissions of ROCs, PM10 and other nonattainment pollutants from a source that exceed 137 pounds per day.
- Rule 207.C.f allows the Air Pollution Control Officer to exempt equipment from the requirements of Rule 207.C.2. if used exclusively as emergency standby equipment for non-utility electrical power generation and not used in conjunction with any utility voluntary demand reduction program, provided that operation for maintenance purposes shall be limited to 100 hours per year, and operation for other than maintenance purposes shall be limited to Actual Interruptions of Power by the serving utility.

East Brawley Geothermal Development Project – Attachment 1
Revised Application for Authority to Construct

- Rule 208 Permit to Operate
- The ICAPCD may inspect and evaluate the new equipment prior to allowing the project to operate under its Permit to Operate.
- Rule 216 Construction or Reconstruction of Major Stationary Sources that Emit Hazardous Air Pollutants
- Requires stationary sources of hazardous air pollutants to install best available control technology for toxics (T-BACT) to any constructed major source.
- Rule 400 Fuel Burning Equipment – Oxides of Nitrogen
- This rule requires that the discharge of NOx from fuel burning equipment not exceed 140 lb/hour. Rule 400 also requires that all fuel burning equipment demonstrate compliance through compliance testing once every 12 months, except that equipment that operates less than 100 hours per 12 month period and emits less than 5 tons NOx shall be tested not less than every 36 months.
- Rule 401 Opacity of Emissions
- The opacity of the emissions for the new source, other than uncombined water vapor, may not be as dark or darker as designated as No. 1 on the Ringlemann Chart (20% opacity) for more than 3 minutes in an hour.
- Rule 403 General Limitations on the Discharge of Air Contaminants
- The limitation in Rule 403 establishes maximum emission rates for particulate matter that vary according to the weight of the materials processed and maximum rates for the discharge of air contaminants that vary according to the volume of dry gases discharged.
- Rule 405 Sulfur Compounds Emission Standards, Limitations and Prohibitions
- Rule 405 prohibits the discharge into the atmosphere emissions of sulfur compounds, calculated as sulfur dioxide, in excess of 0.2 percent by volume, measured at the point of discharge.
- Rule 800-805 Fugitive Dust Requirements for Control of Fine Particulate Matter (PM10)
- These rules control fugitive dust emissions from construction and earthmoving activities, from carry out and track out, from open areas, and paved and unpaved roads.
- Rule 900 Procedures for Issuing Permits to Operate for Sources Subject to Title V of the Federal Clean Air Act Amendments of 1990
- Sources subject to Rule 900 include major sources. Rule 900.B.20 defines “major source” as a stationary source which has the potential to emit a regulated air

East Brawley Geothermal Development Project – Attachment 1
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pollutant or a hazardous air pollutant (HAP) in quantities equal to or exceeding the lesser of any of the following thresholds:

- 100 tons per year (tpy) of any regulated air pollutant;
- 10 tpy of one HAP or 25 tpy of two or more HAPs; or
- Any lesser quantity threshold promulgated by the U.S. EPA.

Rule 902 Request for Synthetic Minor Source Status

This rule authorizes the owners or operators of specified stationary sources that would otherwise be major sources (pursuant to Rule 900) to request and accept federally-enforceable emissions limits sufficient to allow the sources to be considered “synthetic minor sources.”

Rule 1101 New Source Performance Standards (NSPS)

Rule 1101 adopts by reference and incorporates the provisions of Part 60, Chapter I, Title 40 of the Code of Federal Regulations (40 CFR Part 60) into the Rules and Regulations of the Imperial County Air Pollution Control District, and incorporates in its entirety Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

40 CFR Part 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines) applies to only stationary diesel engines which were ordered after July 11, 2005 and were manufactured after April 1, 2006 (if not a fire water pump engine) or after July 1, 2006 (if a fire water pump engine). Owners and operators of stationary emergency diesel engines of 2007 model year and later subject to 40 CFR Part 60, Subpart IIII must:

- Comply with the emission standards for new nonroad diesel engines in 40 CFR 60.4202, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary diesel engines;
- Operate and maintain the diesel engines according to the manufacturer’s written instructions over the entire life of each engine;
- Use fuel which meets the minimum standards set forth in the regulations;
- Install a non-resettable hour meter prior to startup of each engine;
- Limit maintenance checks and readiness testing of each engine to 100 hours per year (there is no time limit on the use of an emergency engine in emergency situations); and

East Brawley Geothermal Development Project – Attachment I
Revised Application for Authority to Construct

- Keep records of the operation of each engine in emergency and non-emergency service that are recorded through the non-resettable hour meter, including recording the time of operation of each engine and the reason each engine was in operation during that time.

Rule 1002 California Airborne Toxic Control Measures (ATCM)

These regulations adopt the following California Code of Regulations (CCR) titles applicable to the proposed project:

Section 93114 – Standards for Non-vehicular Diesel Fuel

Requires 15 ppm sulfur diesel fuel for use in all non-vehicular engines except locomotives and marine engines.

Section 93115 – Airborne Toxic Control Measures (ATCM) for Stationary Compression Ignition Engines.

Requires that new stationary emergency standby diesel-fueled engines >50 hp that operate no more than 50 hours per year for maintenance and testing emit diesel PM at a rate less than or equal to 0.15 g/bhp-hr and meet the standards for off-road engines in Title 13, CCR Section 2423. The ATCM does not limit emissions during emergency use and compliance testing. Lower emissions rates for PM apply to engines that operate between 50 and 100 hours per year.

Rule 1003 Hexavalent Chromium Emissions from Cooling Towers

Rule 1003 applies to all cooling towers. Since the new cooling tower cells will be made of reinforced fiberglass and not wood and since additives containing hexavalent chromium will not be used at the site, the facilities will be eligible for exemption from testing requirements.

POTENTIAL TO EMIT AND ABATED EMISSIONS FROM PROJECT OPERATIONS

Project operations would create sources of:

- hydrogen sulfide (H₂S), ROCs (including benzene (C₆H₆)) and hazardous air pollutant (HAP) (C₆H₆) emissions from the geothermal noncondensable gases through the plant noncondensable gas system (the RTO unit/caustic scrubber system and the cooling tower bypass), the noncondensable gas pipeline condensate drains, the sand separators and the geothermal injection fluid filter system;
- ROCs (isopentane) from the OEC Units, the OEC VRUs and the Maintenance VRU;
- particulates from the cooling towers; and
- NO_x, SO₂, ROCs, CO, and/or PM from the RTO unit/caustic scrubber system, the emergency standby diesel generator engine and the emergency standby fire pump diesel engine.

Geothermal Noncondensable Gas System

Engineering estimates of the up to twenty-five percent of the high end quantity of the geothermal noncondensable gases in the produced geothermal fluid which would be delivered from the high pressure separator are about 28,100 lbs/hr, based on flow testing of the North Brawley Project wells conducted during 2007 and 2008. Approximately 99.97 percent of these gases would be carbon dioxide, methane, argon and nitrogen, with the remainder consisting principally of C₆H₆, H₂S and ammonia. Table 1 lists the hourly, daily and annual potential to emit for these gases from the high pressure separator (see also Figure 7 and APPENDIX A).

Table 1: Noncondensable Gas Potential to Emit from the High Pressure Separator

Pollutant	POTENTIAL TO EMIT		
	(lb/hr)	(lbs/day)	(tons/yr)
Benzene	11.16	267.81	48.88
Hydrogen Sulfide	2.92	70.09	12.79
Methane	365.58	8773.94	1601.24
Ammonia	0.35	8.42	1.54

For most of the hours the East Brawley power plant is operating (equivalent to operating 8,484 hours per year (353.5 days per year) if the power plant operates 8,760 hours per year (365 days per year)) these NCGs would be delivered to the RTO unit/caustic scrubber system. The RTO unit would remove by thermal oxidation essentially all of the ammonia and a minimum of 98 percent of the CH₄, C₆H₆ and H₂S in the geothermal noncondensable gases delivered to the RTO unit. The oxidation of the hydrocarbons in the NCG would produce only water vapor and carbon dioxide. The oxidization of hydrogen sulfide by the RTO unit would produce sulfur dioxide at the ratio of the molecular weights of sulfur dioxide (64.06) to hydrogen sulfide (34.08). The oxidization of ammonia by the RTO unit would produce nitrogen oxides. Conservatively assuming that all of the nitrogen oxides are nitrogen dioxide, oxidization of the ammonia in the NCG by the RTO unit would produce nitrogen dioxide at the ratio of the molecular weights of nitrogen dioxide (45.99) to ammonia (17.03). Table 2 lists the maximum

hourly and daily abated air pollutant emissions from the RTO unit based on the NCG vent stack inlet rates to the RTO unit and the RTO unit control efficiencies.

Table 2: Maximum Hourly and Daily Abated Air Pollutant Emission Rates from Oxidation of the NCGs in the RTO Unit/Caustic Scrubber System

Pollutant	Inlet Rates (lb/hr)	Minimum RTO Control Efficiency	Caustic Scrubber Inlet Rates (lb/hr)	Minimum Caustic Scrubber Control Efficiency	Exhaust Gas Emission Rates	
					(lb/hr)	(lb/day)
Benzene (ROC)	11.159	98.00%	0.223	0.00%	0.223	5.36
Hydrogen Sulfide	2.920	98.00%	0.058	0.00%	0.058	1.40
Methane	365.581	98.00%	7.312	0.00%	7.312	175.48
Ammonia	0.351	100.00%	0.000	0.00%	0.000	0.00
Sulfur Dioxide	0.000	0.00%	5.380	97.50%	0.134	3.23
Nitrogen Oxides	0.000	0.00%	0.948	0.00%	0.948	22.75
PM10	0.000	0.00%	0.000	0.00%	0.500	12.00

The caustic scrubber would remove a minimum of 97.5 percent of the SO₂ created in the RTO unit, but would also create PM₁₀ emissions. These PM₁₀ emissions from the caustic scrubber would be generated from the dissolved solids in the small amount of caustic scrubbing liquid entrained in the gases emitted from the caustic scrubber stack. Table 2 also lists the maximum hourly and daily abated air pollutant emissions from the caustic scrubber stack based on the outlet from the RTO unit and the caustic scrubber system control efficiency.

Up to 0.5 MMbtu/hr of propane would be burned to supplement the heat in the RTO unit oxidation chamber from the oxidation of the NCGs. Table 3 lists the maximum hourly and daily abated air pollutant emissions from the RTO unit/caustic scrubber system from the combustion of the propane only. Table 4 lists the total maximum hourly and daily abated air pollutant emissions from the RTO unit/caustic scrubber system by adding the NCG oxidation and abatement emissions listed in Table 2 and the propane oxidation and abatement emission from Table 3.

Table 3: Maximum Hourly and Daily Abated Air Pollutant Emission Rates from Propane Combustion for the RTO Unit/Caustic Scrubber System

Pollutant	Inlet Rates (lb/hr)	Minimum RTO Control Efficiency	Caustic Scrubber Inlet Rates (lb/hr)	Minimum Caustic Scrubber Control Efficiency	Exhaust Gas Emission Rates	
					(lb/hr)	(lb/day)
Sulfur Dioxide	0.000	0.00%	0.000	97.50%	0.000	0.00
Nitrogen Oxides	0.000	0.00%	0.077	0.00%	0.077	1.86
PM10	0.000	0.00%	0.002	0.00%	0.002	0.05
Carbon Monoxide	0.000	0.00%	0.010	0.00%	0.010	0.25
Propane ROCs	23.425	100.00%	0.000	0.00%	0.000	0.00

Table 4: Total Maximum Hourly and Daily Abated Air Pollutant Emission Rates from the RTO Unit/Caustic Scrubber System

Pollutant	Inlet Rates (lb/hr)	Minimum RTO Control Efficiency	Caustic Scrubber Inlet Rates (lb/hr)	Minimum Caustic Scrubber Control Efficiency	Exhaust Gas Emission Rates	
					(lb/hr)	(lb/day)
Benzene (ROC)	11.159	98.00%	0.223	0.00%	0.223	5.36
Hydrogen Sulfide	2.920	98.00%	0.058	0.00%	0.058	1.40
Methane	365.581	98.00%	7.312	0.00%	7.312	175.48
Ammonia	0.351	100.00%	0.000	0.00%	0.000	0.00
Sulfur Dioxide	0.000	0.00%	5.380	97.50%	0.135	3.23
Nitrogen Oxides	0.000	0.00%	1.025	0.00%	1.025	24.61
PM10	0.000	0.00%	0.002	0.00%	0.502	12.05
Carbon Monoxide	0.000	0.00%	0.010	0.00%	0.010	0.25
Propane ROCs	23.425	100.00%	0.000	0.00%	0.000	0.00

The annual emissions of the NCG-related air pollutants delivered to the power plant from the high-pressure separators or processed through the RTO unit/caustic scrubber system are the sum of the annual emissions when the RTO unit/caustic scrubber is operating and the annual emissions when the RTO unit/caustic scrubber is not operating. The maximum annual emissions for each power plant NCG-related air pollutant is calculated in Table 5 using RTO unit/caustic scrubber system operations of 8,484 hours (8,760 hours – 276 hours) (353.5 days) per year.

Table 5: Maximum Annual Air Pollutant Emission Rates from the Geothermal Noncondensable Gas System

Pollutant	RTO Not Operating			RTO Operating			Total (tons/yr)
	(lb/day)	(days/yr)	(tons/yr)	(lb/day)	(days/yr)	(tons/yr)	
Benzene (ROC)	267.81	11.50	1.54	5.36	353.50	0.95	2.49
Hydrogen Sulfide	70.09	11.50	0.40	1.40	353.50	0.25	0.65
Methane	8,773.94	11.50	50.45	175.48	353.50	31.02	81.47
Ammonia	8.42	11.50	0.05	0.00	353.50	0.00	0.05
Sulfur Dioxide	0.00	11.50	0.00	3.23	353.50	0.57	0.57
Nitrogen Oxides	0.00	11.50	0.00	24.61	353.50	4.35	4.35
PM10	0.00	11.50	0.00	0.50	353.50	0.09	0.09
Carbon Monoxide	0.00	11.50	0.00	0.25	353.50	0.04	0.04
Pentane ROCs	0.00	11.50	0.00	0.50	353.50	0.09	0.09

Sand Separators

The Project would release up to 125 gallons of separated geothermal brine containing up to 1.1 ppm of hydrogen sulfide, 5.6 ppm benzene and 141.8 ppm ammonia gases from each of the approximately 46 well pad and power plant sand separators up to twelve times per day. Conservatively assuming that half (23) of the 46 sand separators would discharge during the same hour, the hourly potential to emit for H₂S, benzene, ROCs and ammonia is as shown in Table 6. With twelve discharges per day, 365 days per year, the daily and annual potential to emit are as shown in Table 7 and Table 8, respectively (see also APPENDIX A).

Table 6: Balance of Power Plant Hourly Potential to Emit

Emission Source	Potential to Emit (lbs/hr)				
	H2S	PM10	ROC	C6H6	NH3
Sand Separators NCG Emissions	0.10	0.00	0.52	0.52	13.04
Injection Filters NCG Emissions	0.01	0.00	0.04	0.04	0.91
NCG Pipeline Condensate Drains Emissions	0.00	0.00	0.00	0.00	0.02
North Cooling Tower Emissions	0.00	2.58	0.00	0.00	0.00
South Cooling Tower Emissions	0.00	2.58	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	87.04	0.00	0.00
Plant Source Total:	0.11	5.17	87.60	0.56	13.97

Table 7: Balance of Power Plant Daily Potential to Emit

Emission Source	Potential to Emit (lbs/day)				
	H2S	PM10	ROC	C6H6	NH3
Sand Separators NCG Emissions	2.47	0.00	12.46	12.46	313.08
Injection Filters NCG Emissions	0.06	0.00	0.29	0.29	7.26
NCG Pipeline Condensate Drains Emissions	0.00	0.00	0.02	0.02	0.49
North Cooling Tower Emissions	0.00	62.02	0.00	0.00	0.00
South Cooling Tower Emissions	0.00	62.02	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	136.00	0.00	0.00
Plant Source Total:	2.53	124.03	148.77	12.77	320.83

Table 8: Balance of Power Plant Annual Potential to Emit

Emission Source	Potential to Emit (tons/yr)				
	H2S	PM10	ROC	C6H6	NH3
Sand Separators NCG Emissions	0.45	0.00	2.27	2.27	57.14
Injection Filters NCG Emissions	0.01	0.00	0.05	0.05	1.32
NCG Pipeline Condensate Drains Emissions	0.00	0.00	0.00	0.00	0.09
North Cooling Tower Emissions	0.00	11.32	0.00	0.00	0.00
South Cooling Tower Emissions	0.00	11.32	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	24.82	0.00	0.00
Plant Source Total:	0.46	22.64	27.15	2.33	58.55

Injection Filter System

The Project would release up to 25 gallons of separated geothermal brine containing up to 1.1 ppm of hydrogen sulfide, 5.6 ppm benzene and 141.8 ppm ammonia gases from each of the approximately 64 geothermal injection filter system units up to four times per day. Conservatively assuming that half (32) of the 64 filter system units would discharge during the same hour, the hourly potential to emit for H₂S, benzene, ROCs and ammonia is as shown in Table 6. With four discharges per day, 365 days per year, the daily and annual potential to emit are as shown in Table 7 and Table 8, respectively (see also APPENDIX A).

Noncondensable Gas Condensate Drains

The Project would also release up to 18 gallons of condensate each hour from the noncondensable gas pipeline drains containing up to 1.1 ppm of hydrogen sulfide, 5.6 ppm benzene and 141.8 ppm ammonia gases. The hourly, daily and annual potential to emit from these noncondensable gas condensate drains are as shown in Table 6, Table 7 and Table 8, respectively (see also APPENDIX A).

Isopentane Sources

Each OEC Unit would have minor leaks of ROCs (isopentane) from the valves, connections, seals, and tubes which would be released either to the atmosphere or into the geothermal fluid or circulating cooling water lines. Isopentane would also be discharged to the atmosphere through the OEC VRUs, and during OEC Unit maintenance activities through the Maintenance VRU and opening sections of the OEC VRUs for maintenance. Experience with the most recent generation of OEC Units indicates that about one-third of the isopentane is discharged through fugitive emissions, and two-thirds from maintenance activities. Very little isopentane is discharged to the atmosphere through the OEC VRUs. Based on the results of quarterly inventories of isopentane in storage at other projects, Table 6, Table 7 and Table 8 provide the estimated hourly, daily and annual potential to emit isopentane, respectively (see also APPENDIX A).

Project operators would frequently inspect and monitor the OEC Units for isopentane leaks and visual signs of fugitive isopentane emissions. Ormat would also keep a record of valves, connections, seals, and tubes replaced to reduce pentane fugitive emissions.

Cooling Towers

The two Project cooling towers would each circulate up to 110,000 gallons of cooling water per minute containing up to 9,400 ppm by weight of total dissolved solids (TDS). High efficiency cooling tower drift eliminators would limit the drift rate to 0.0005 percent of the circulating cooling water rate. Conservatively assuming that all of the aerosols which form when the emitted cooling tower drift evaporated are PM₁₀ or smaller, then the hourly PM₁₀ potential to emit for each cooling tower is as shown in Table 6. With each cooling tower assumed to operate 24 hours per day, 365 days per year, the daily and hourly PM₁₀ potential to emit are as listed in Table 7 and Table 8, respectively (see also APPENDIX A).

Emergency Standby Diesel Engine-Generator

The 535 kW emergency standby diesel engine-generator would meet the applicable California Air Resources Board (CARB) Tier 3 stationary compression ignition engine exhaust emission standards of NMHC+NO_x = 4.0, CO = 3.5 and PM = 0.20 grams per kilowatt-hour.

The engine would also comply with the CARB “Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines” for new stationary emergency standby diesel-fueled compression ignition engines >50 bhp (PM₁₀ ≤ 0.15 g/bhp-hr). As required by the ATCM, this diesel engine would also burn CARB diesel fuel (≤ 15 ppm sulfur). In compliance with the ATCM, this diesel engine would be tested for a total of less than 50 hours per year (for up to one hour per day). Other than for testing, this engine would operate only in emergencies.

Table 9, Table 10 and Table 11 provide the calculated hourly, daily and annual potential to emit, respectively, for this engine for the criteria air pollutants PM₁₀, NO_x, CO and SO₂, and for the criteria air pollutant precursor ROC, assuming that the engine is tested for no more than one hour per day. Table 12 provides the summary of the calculated annual HAP potential to emit, and Table 13 the summary of the calculated annual HAP abated emissions, for this engine.

Table 9: Emergency Diesel Engines Hourly Potential to Emit

Emission Source	Potential to Emit (lbs/hr)				
	PM10	ROC	CO	NO _x	SO ₂
East Brawley Geothermal Development Project					
Emergency Standby Diesel Fire-Water Pump Engine	0.043	0.066	0.284	2.545	0.003
Emergency Standby Diesel Generator Engine	0.236	0.120	4.126	4.595	0.009
Emergency Engines Total:	0.278	0.186	4.410	7.140	0.012

Table 10: Emergency Diesel Engines Daily Potential to Emit

Emission Source	Potential to Emit (lbs/day)				
	PM10	ROC	CO	NO _x	SO ₂
East Brawley Geothermal Development Project					
Emergency Standby Diesel Fire-Water Pump Engine	0.043	0.066	0.284	2.545	0.003
Emergency Standby Diesel Generator Engine	0.236	0.120	4.126	4.595	0.009
Emergency Engines Total:	0.278	0.186	4.410	7.140	0.012

Table 11: Emergency Diesel Engines Annual Potential to Emit

Emission Source	Potential to Emit (tons/yr)				
	PM10	ROC	CO	NO _x	SO ₂
East Brawley Geothermal Development Project					
Emergency Standby Diesel Fire-Water Pump Engine	0.0011	0.0017	0.0071	0.0636	0.0001
Emergency Standby Diesel Generator Engine	0.0059	0.0030	0.1031	0.1149	0.0002
Emergency Engines Total:	0.0070	0.0047	0.1102	0.1785	0.0003

Table 12: Hazardous Air Pollutant Potential to Emit by Emission Unit

Emission Source	Hazardous Air Pollutant Potential to Emit (tons/yr)		
	Diesel HAPs	C6H6	Totals
High Pressure Separator PTE	0.00000	48.8754	48.8754
RTO Unit/Scrubber NCG Abatement System Emissions	0.00000	0.0000	0.0000
Sand Separators NCG Emissions	0.00000	2.2739	2.2739
Injection Filters NCG Emissions	0.00000	0.0527	0.0527
NCG Pipeline Condensate Drains Emissions	0.00000	0.0036	0.0036
North Cooling Tower Emissions	0.00000	0.0000	0.0000
South Cooling Tower Emissions	0.00000	0.0000	0.0000
OEC Isopentane Emissions	0.00000	0.0000	0.0000
Emergency Standby Diesel Fire-Water Pump Engine	0.00184	0.0000	0.0018
Emergency Standby Diesel Generator Engine	0.01015	0.0000	0.0102
Totals:	0.01199	51.2056	51.2176

Table 13: Hazardous Air Pollutant Abated Emissions by Emission Unit

Emission Source	Hazardous Air Pollutant Emissions (tons/yr)		
	Diesel HAPs	C6H6	Totals
High Pressure Separator PTE	0.00000	1.53991	1.53991
RTO Unit/Scrubber NCG Abatement System Emissions	0.00000	0.94671	0.94671
Sand Separators NCG Emissions	0.00000	2.27388	2.27388
Injection Filters NCG Emissions	0.00000	0.05273	0.05273
NCG Pipeline Condensate Drains Emissions	0.00000	0.00356	0.00356
North Cooling Tower Emissions	0.00000	0.00000	0.00000
South Cooling Tower Emissions	0.00000	0.00000	0.00000
OEC Isopentane Emissions	0.00000	0.00000	0.00000
Emergency Standby Diesel Fire-Water Pump Engine	0.00184	0.00000	0.00184
Emergency Standby Diesel Generator Engine	0.01015	0.00000	0.01015
Totals:	0.01199	4.81678	4.82877

Emergency Standby Diesel Fire Pump Engine

Based on manufacturer’s certifications, the 215 kW emergency standby diesel fire pump engine would emit less than the applicable CARB Tier 2 stationary compression ignition engine exhaust emission standards of NMHC+NOx = 6.6, CO = 3.5 and PM = 0.20 grams per kilowatt-hour.

The engine would also comply with the CARB “Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines” for new stationary emergency standby diesel-fueled

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compression ignition engines >50 bhp ($PM \leq 0.15$ g/bhp-hr). As required by the ATCM, this diesel engine would also burn CARB diesel fuel (≤ 15 ppm sulfur). In compliance with the ATCM, this diesel engine would be tested for a total of less than 50 hours per year (for up to one hour per day). Other than for testing, this engine would operate only in emergencies.

Table 9, Table 10 and Table 11 provide the calculated hourly, daily and annual potential to emit, respectively, for this engine for the criteria air pollutants PM_{10} , NO_x , CO and SO_2 , and for the criteria air pollutant precursor ROC, assuming that the engine is tested for no more than one hour per day. Table 12 provides the summary of the calculated annual HAP potential to emit, and Table 13 the summary of the calculated annual HAP abated emissions, for this engine.

Summary of Facility Calculated Potential to Emit

Table 14 provides a summary of the Facility potential to emit air pollutants and air pollutant precursors from all emission units. Table 15 provides a summary of the Facility abated emissions of these air pollutants and air pollutant precursors from all emission units. Table 12 provides the summary of the calculated annual HAP potential to emit, and Table 13 the summary of the calculated annual HAP abated emissions, for each emission unit.

Table 14: Summary of Facility Potential to Emit

Description	Facility Potential to Emit							
	PM10	SO2	CO	NOx	ROC	H2S	NH3	C6H6
Hourly PTE (lbs):	5.45	0.0122	4.41	7.14	98.94	3.03	14.32	11.71
Daily PTE (lbs):	124.31	0.0122	4.41	7.14	416.76	72.62	329.25	280.58
Annual PTE (tons):	22.64	0.0003	0.11	0.18	76.03	13.25	60.09	51.21

Table 15: Summary of Facility Abated Emissions

Description	Facility Abated Emissions							
	PM10	SO2	CO	NOx	ROC	H2S	NH3	C6H6
Hourly PTE (lbs):	5.95	0.1467	4.41	8.09	88.01	0.17	13.97	0.78
Daily PTE (lbs):	136.31	3.2401	4.41	29.89	154.31	3.93	320.83	18.12
Annual PTE (tons):	24.79	0.5708	0.11	4.20	29.64	1.11	58.60	4.82

POTENTIAL EMISSIONS FROM CONSTRUCTION AND WELL FIELD START-UP ACTIVITIES

Grading and Site Construction

Construction of the power plant, new access roads and pipelines would produce fugitive dust from site grading and other construction-related surface disturbing activities. Construction of the power plant would directly disturb about 15 acres of land, and another 10 acres would be disturbed for the adjacent equipment laydown and fabrication yard (although the equipment laydown and fabrication yard would be reclaimed following the completion of construction). All surface-disturbing activities would implement appropriate techniques to comply with ICAPCD Regulation VIII to apply BACT to limit dust emissions. These would include watering the construction area at least twice a day; increasing watering frequency when winds exceed 15 mph; limiting vehicular speed to 15 mph on dirt roads and areas; and using gravel ramps at road entrances.

Existing access roads (paved, graveled or dirt) would be utilized to the extent practical. Any new access required for the Project would be constructed adjacent to the edges of the agricultural fields and parallel to irrigation canals and drains that traverse the Project area. Approximately 14 miles of pipeline would be built, but no new roads would be built for pipeline construction or maintenance and pipeline construction would not require grading of the pipeline routes.

Well Field Start-Up

Geothermal injection wells which are shut in for a period of time may develop a small cap of geothermal noncondensable gases in the well bore above the standing geothermal fluid as these gases are slowly released from the geothermal fluid. The relative proportions of these gases would generally resemble that in the produced geothermal noncondensable gas stream - approximately 99.97 percent carbon dioxide, methane, nitrogen, and argon, with the remainder consisting principally of C_6H_6 , H_2S and ammonia.

Prior to placing any injection well into, or back into, service, these geothermal noncondensable gases capping the geothermal fluid would be discharged unabated to the atmosphere through a stack on the well site.

COMPLIANCE WITH APPLICABLE REGULATIONS

Rule 201 Permits Required

The Project is a new Facility that will emit air contaminants and thus requires an Authority to Construct from the ICAPCD.

Rule 206 Processing of Applications

Rule 206.A.4.c provides that the Air Pollution Control Officer shall take reasonable steps to insure that no Project will emit air contaminants that may endanger the short or long term health, safety or property of Persons. Attached as APPENDIX B is an assessment of the potential health risks of the benzene and hydrogen sulfide emissions from the geothermal noncondensable gas system. This assessment demonstrates that the Project would not emit benzene or hydrogen sulfide that would endanger the long-term health of nearby sensitive receptors.

Rule 207 New and Modified Stationary Source Review

Rule 207.C.1.a requires Best Available Control Technology (BACT) for equipment with the potential to emit 25 pounds per day or more of any nonattainment pollutant or its precursors.

The PM10 potential to emit from each cooling tower would exceed 25 lbs/day (see Table 7), and will require BACT, in the form of high efficiency drift eliminators capable of controlling cooling tower drift to 0.0005 percent or less of the circulating cooling water.

Each OEC Unit has the potential to emit more than 25 lbs/day of ROCs (isopentane) from major maintenance activities (see Table 7) and will require BACT. For each OEC Unit, BACT is use of the Maintenance VRU during OEC Unit maintenance activities. In addition, the use of OEC VRUs on each OEC Unit condenser and frequent inspection, monitoring and maintenance of each OEC Unit limits isopentane emissions.

The well pad high pressure separators have the potential to emit ROCs (benzene) in excess of 25 lbs/day (see Table 1) and will require BACT. Seventy-five percent (or more) of the noncondensable gases (including benzene) separated by the high pressure separators will be dissolved/entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. None of these gases will be emitted to the atmosphere. The other twenty-five percent (or less) of these separated geothermal noncondensable gases would flow through dedicated pipelines to the RTO unit/caustic scrubber system located at the power plant site. This system is considered BACT for the ROCs in this noncondensable gas stream as it will remove a minimum of 98 percent of the benzene in this gas stream.

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Rule 207.C.1.c requires Best Available Control Technology (BACT) for equipment with the potential to emit 55 pounds per day or more of hydrogen sulfide. None of the well pad high pressure separators will individually have the potential to emit more than 55 lbs/day of hydrogen sulfide, although together they will have the potential to emit more than 55 lbs/day of hydrogen sulfide during operations (see Table 1). These gases will be directed to the RTO unit/caustic scrubber system located at the power plant site, which will remove at least 98 percent of the hydrogen sulfide in this gas stream, which is considered to be BACT for the removal of hydrogen sulfide from these types of gasses.

Best Available Control Technology would not be required for any other emission unit.

Rule 207.C.2.a requires offsets for all emissions of ROCs, PM10 and other nonattainment pollutants from a source that exceed 137 pounds per day. The power plant would emit ROCs in excess of 137 pounds per day, so offsets will be required for the Facility. With ROCs emissions of 154.31 lbs/day (including the two emergency engines - see Table 15), the Facility would require offsets (at a ratio of 1.2 to 1) for 17.31 lbs/day, or 0.79 tons/quarter. However, Rule 207.C.f allows the Air Pollution Control Officer to exempt the two emergency engines from the offset requirements of Rule 207.C.2, which Ormat hereby requests. Without the ROC emissions from the two emergency engines, Facility ROC emissions would be 154.12 lbs/day, and the Facility would require offsets (at a ratio of 1.2 to 1) for 17.12 lbs/day, or 0.78 tons/quarter

Offsets would not be required for any other attainment or nonattainment air pollutant.

Rule 208 Permit to Operate

The ICAPCD may inspect and evaluate the new equipment prior to allowing the project to operate under its Permit to Operate. The Project would be available to the ICAPCD for inspection once it is constructed and commences operation.

Rule 216 Construction or Reconstruction of Major Stationary Sources that Emit Hazardous Air Pollutants

Rule 216 requires stationary sources of hazardous air pollutants to install best available control technology for toxics (T-BACT) on any constructed major source.

The well pad high pressure separators together have the potential to emit benzene in excess of 10 tons/yr and will require the implementation of T-BACT. Seventy-five percent or more of the benzene separated by the high pressure separators will be dissolved/entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. None of this benzene will be emitted to the atmosphere. The other twenty-five percent (or less) of the benzene in the

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separated geothermal noncondensable gases would flow through dedicated pipelines to the RTO unit/caustic scrubber system located at the power plant site. This scrubbing system is considered T-BACT for the benzene in this noncondensable gas stream as it will remove a minimum of 98 percent of the benzene in this gas stream.

Rule 400 Fuel Burning Equipment – Oxides of Nitrogen

Each of the emergency standby diesel engines would emit less than 5 lb/hour of NO_x (see Table 9), far less than the standard of 140 lb/hour of NO_x. They would each also operate less than 50 hours per 12 month period and emit far less than the annual 5 tons of NO_x standard (see Table 11).

The definition of “fuel burning equipment” in Rule 101 excludes equipment that “serves primarily as air pollution control equipment by using a combustion process to destroy air contaminants.” Thus, the proposed RTO unit/caustic scrubber system is not considered “fuel burning equipment,” and Rule 400 is not applicable to the proposed RTO unit/caustic scrubber.

Rule 401 Opacity of Emissions

The cooling tower water vapor emissions are exempted from the requirements of Rule 401. The emissions of particulates from each of the emergency standby diesel engines would be in compliance with the California diesel particulate ATCM, and thus have an opacity substantially lighter than the No. 1 on the Ringlemann Chart (20% opacity) required by Rule 401.

Rule 403 General Limitations on the Discharge of Air Contaminants

Rule 403 prohibits emission of particulate matter in excess of the emission rates in Table 403-1. The weight of the cooling water circulating through each cooling tower is about 55,000,000 lbs/hr. In Table 403-1, the maximum discharge of particulate matter for any process that handles more than 1,000,000 lbs/hr is 30.0 lbs/hr. The particulate potential to emit from each cooling tower would be less than 3.0 lbs/hr (see Table 7).

Rule 403 also prohibits emission of air contaminants in excess of the rates in Table 403-2. The dry volume of gas (air) flowing through each cell of each cooling tower is estimated at 1,200,000 dry standard cubic feet per hour.

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Table 16: Calculation of Maximum Concentrations of Air Contaminants

Description	Maximum Concentration of Air Contaminants				
	PM	PM10	H2S	H2S	H2S
Cooling Tower emissions [each tower] (lbs/hr):	2.584	2.584			
RTO Unit/Caustic Scrubber System emissions (lbs/hr):			0.058		
Sand separators emissions (lbs/hr):				0.103	
Injection filter emissions (lbs/hr):					0.007
Cooling Tower emissions (grains/min):	301.5	301.5			
Cooling Tower dscfm [each tower]:	13,000,000	13,000,000			
Cooling Tower Air Contaminant Concentrations (grains/dscf):	0.0000232	0.0000232			
Concentration Limitation - Rule 403.B.2: (Exceeded?)	0.0100 NO	0.0100 NO			
Noncondensable Gases in Geothermal Brine (%):				0.55%	0.55%
Mass of Noncondensable Gases Emitted (lbs/hr):			45,689.7	505.2	35.1
Molecular Weight of Air:			28.97	28.97	28.97
Molecular Weight of Carbon Dioxide:			44.01	44.01	44.01
CO2/air molecular mass ratio:			1.52	1.52	1.52
Density of Dry Air at STP (lbs/cu ft):			0.075	0.075	0.075
Density of Dry CO2 Gas at STP (lbs/cu ft):			0.114	0.114	0.114
Volume of Noncondensable Gases Emitted (cu ft/hr):			401,008.8	4,434.3	308.5
Molecular Weight of Hydrogen Sulfide:			34.08	34.08	34.08
Molecular Weight of Sulfur Dioxide:			64.06	64.06	64.06
SO2/H2S molecular mass ratio:			1.88	1.88	1.88
Sulfur Dioxide equivalent mass emission rate (lbs/hr):			0.110	0.193	0.013
Density of Dry SO2 Gas at STP (lbs/cu ft):			0.166	0.166	0.166
Volume of Sulfur Dioxide Equivalent Gases Emitted (cu ft/hr):			0.6620	1.1665	0.0811
Sulfur Dioxide Concentration (%):			0.00017%	0.02631%	0.02631%
Sulfur Dioxide Concentration Limit (%) (Rule 405B.1.a): (Exceeded?)			0.20000% NO	0.20000% NO	0.20000% NO

Rule 405 Sulfur Compounds Emission Standards, Limitations and Prohibitions

Rule 405B.1.a prohibits the discharge into the atmosphere of sulfur compounds, calculated as sulfur dioxide, in excess of 0.2 percent by volume, measured at the point of discharge. The maximum concentration of hydrogen sulfide, calculated as sulfur dioxide, in the geothermal noncondensable gases which would be discharged through the sand separators, injection filter system and condensate drains is 0.02631 percent by volume (see Table 16). The concentration of hydrogen sulfide, calculated as sulfur dioxide, in the RTO unit/caustic scrubber system which would be discharged through the scrubber system stack is 0.00025 percent by volume (see Table 16). Both are substantially below the limit of 0.2 percent by volume.

Rule 800-805 Fugitive Dust Requirements for Control of Fine Particulate Matter (PM10)

These rules control fugitive dust emissions from construction and earthmoving activities, from carry out and track out, from open areas, and paved and unpaved roads. If necessary, Ormat would revise its current dust control plan and provide 10-day advance notice to the ICAPCD. During construction Ormat would water disturbed lands to reduce dust emissions. After construction fugitive dust from open areas would be controlled through application and maintenance of water or dust suppressant(s) to all unvegetated areas, establishing vegetation on previously

East Brawley Geothermal Development Project – Attachment 1
Revised Application for Authority to Construct

disturbed areas, or paving, applying and maintaining gravel, or applying and maintaining chemical stabilizers/suppressants.

Rule 900 Procedures for Issuing Permits to Operate for Sources Subject to Title V of the Federal Clean Air Act Amendments of 1990

The Facility does not have the potential to emit 100 tons per year (tpy) or more of any regulated air pollutant. The Facility would have the potential to emit 10 tpy or more of benzene, a hazardous air pollutant (HAP), except for the implementation of the RTO unit/caustic scrubber system. If the Facility's request for synthetic minor source status is accepted by the District, the Facility would not be a major source subject to Rule 900.

Rule 902 - Request for Synthetic Minor Source Status

This rule authorizes the owners or operators of specified stationary sources that would otherwise be major sources (pursuant to Rule 900) to request and accept federally-enforceable emissions limits sufficient to allow the sources to be considered "synthetic minor sources." The Facility is submitting as part of this application a request for synthetic minor source status as the proposed implementation of the RTO unit/caustic scrubber system would reduce the Facility's potential to emit benzene, a hazardous air pollutant (HAP), from in excess of 10 tpy to well under 10 tpy. These emission limitations would be set forth in permit conditions practicably enforceable by U.S. EPA and citizens or by the District.

Rule 1101 New Source Performance Standards (NSPS)

All of the stationary emergency engines proposed for the Facility would be new diesel engines, and therefore would be subject to the requirements of 40 CFR Part 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines). Ormat Nevada, Inc. will comply with the requirements of this NSPS by:

- Operating and maintaining the diesel engines according to the manufacturer's written instructions over the entire life of each engine;
- Using fuel which meets the minimum standards set forth in the regulations;
- Installing a non-resettable hour meter prior to startup of the engine;
- Limiting maintenance checks and readiness testing of each engine to less than 50 hours per year; and
- Keeping records of the operation of each engine in emergency and non-emergency service that are recorded through the non-resettable hour meter, including recording the time of operation of each engine and the reason each engine was in operation during that time.

East Brawley Geothermal Development Project – Attachment I
Revised Application for Authority to Construct

Rule 1002 California Airborne Toxic Control Measures (ATCMs)

Each of the two emergency standby diesel engines would meet the applicable CARB Tier stationary compression ignition engine exhaust emission standards and comply with the CARB “Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines” for new stationary emergency standby diesel-fueled compression ignition engines >50 bhp. In compliance with the ATCM, each of these diesel engines would be tested for a total of less than 50 hours per year (for up to one hour per day). Other than for testing, each emergency standby engine would operate only in emergencies. Each engine would also burn CARB diesel fuel (≤ 15 ppm sulfur).

Rule 1003 Hexavalent Chromium Emissions from Cooling Towers

The cooling towers would not use additives containing hexavalent chromium, and would thus be eligible for exemption from testing requirements.

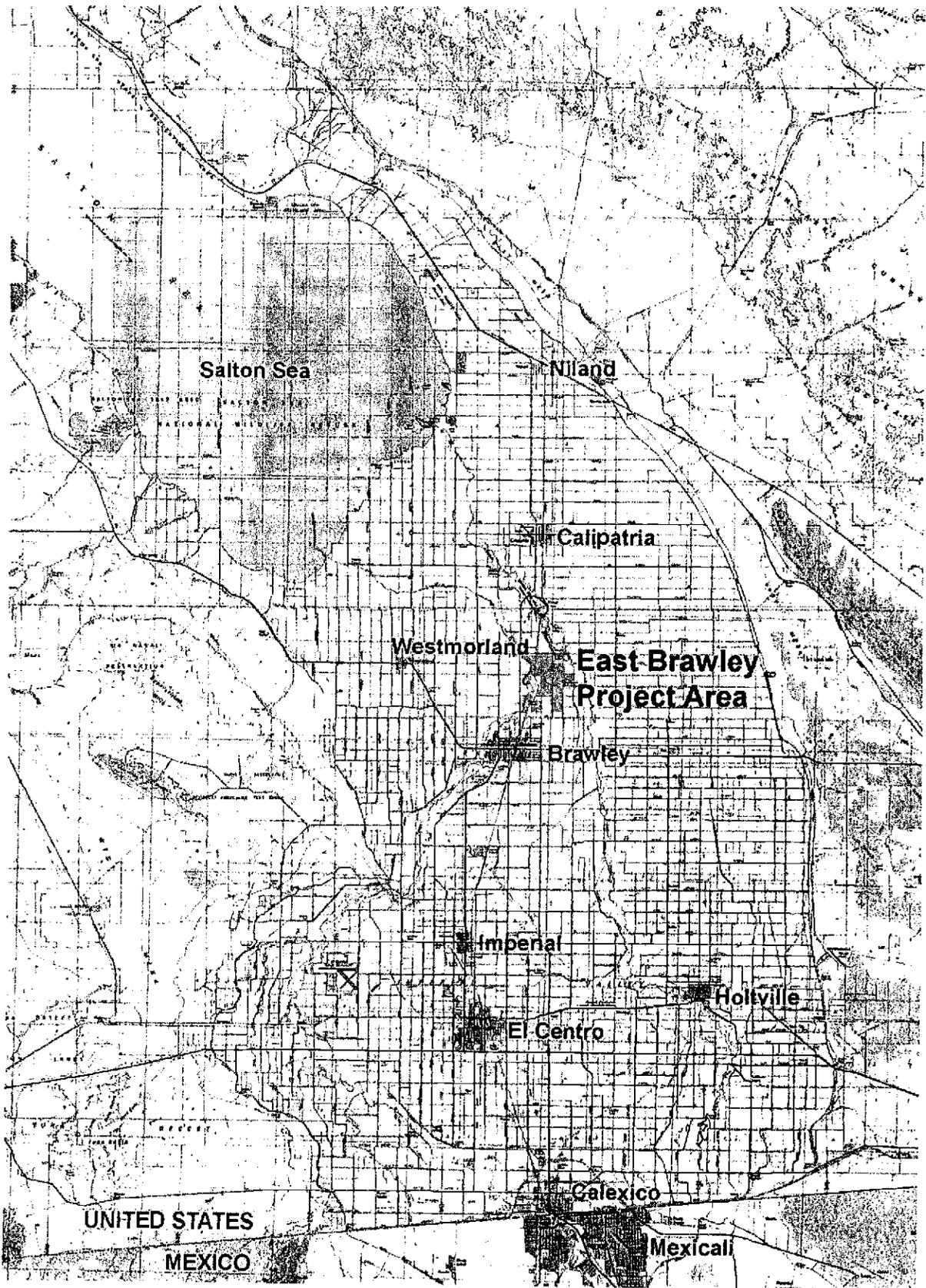
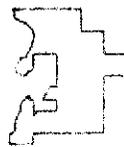


Figure 1: East Brawley Geothermal Development Project Location Map



- Proposed Geothermal Development Well Site: ●
- Approved Geothermal Exploration Well Site: ●
- Proposed Geothermal Pipeline Route: —└┘—
- Proposed Freshwater Pipeline Route: —└┘—
- Proposed New River Crossing: —└┘—

Project Area Extents
Shown on the Figure:



TN MN
12°

0 0.5 1.0
Miles

Figure 2: East Brawley Project Power Plant and Wellfield Map

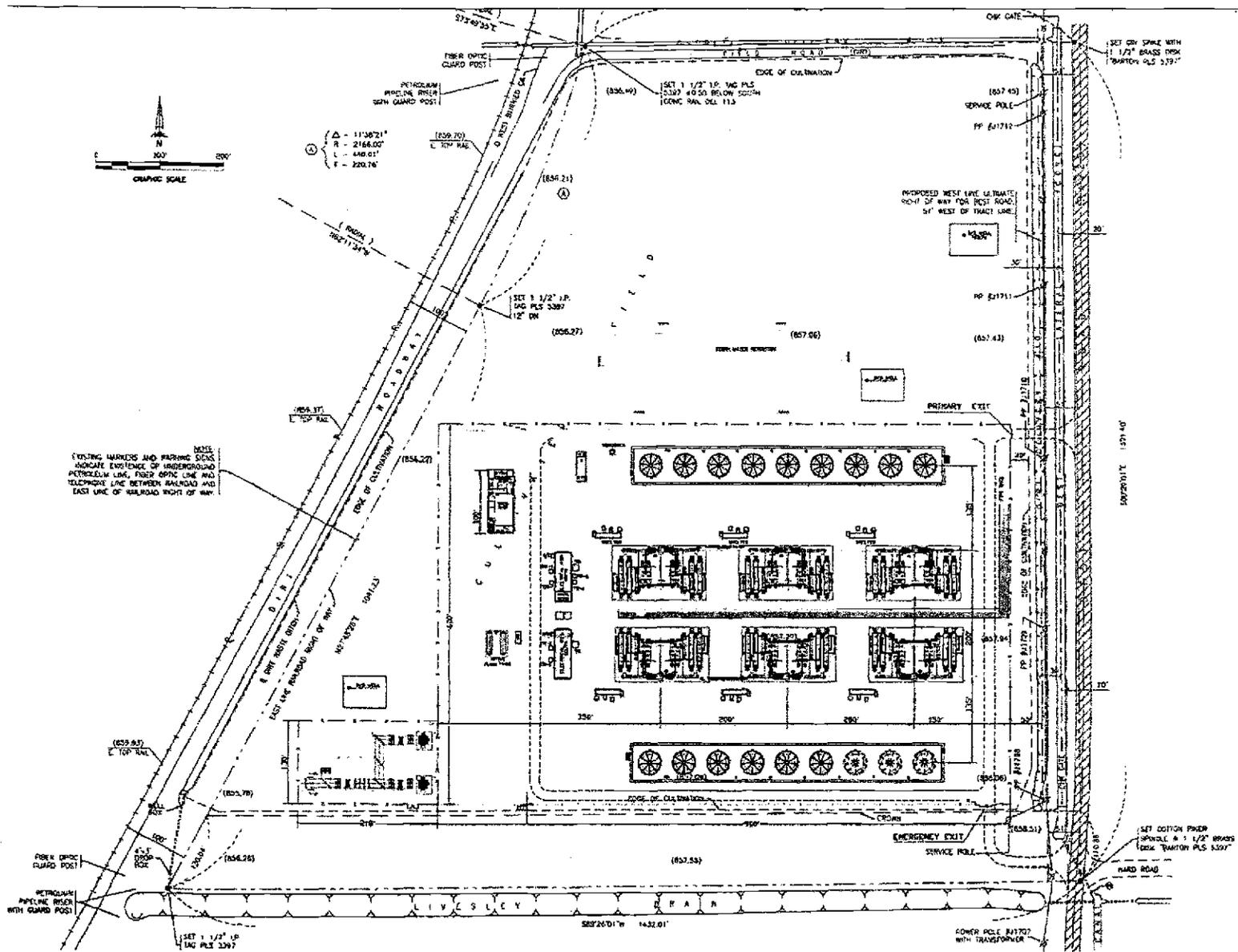


Figure 3: East Brawley Project Power Plant General Arrangement – Map View

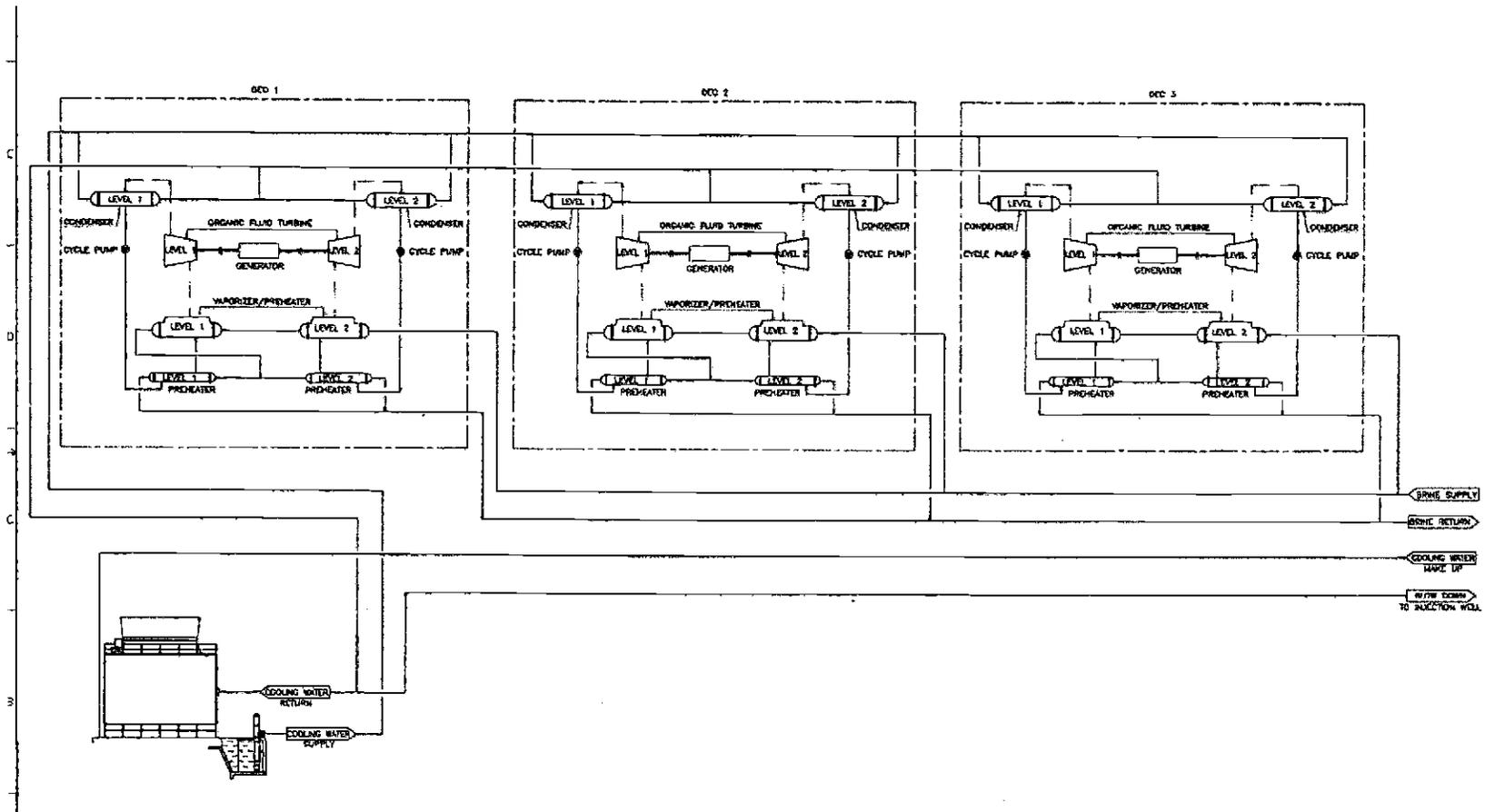


Figure 4: East Brawley Project Power Plant Basic Block Diagram (Sheet 1)

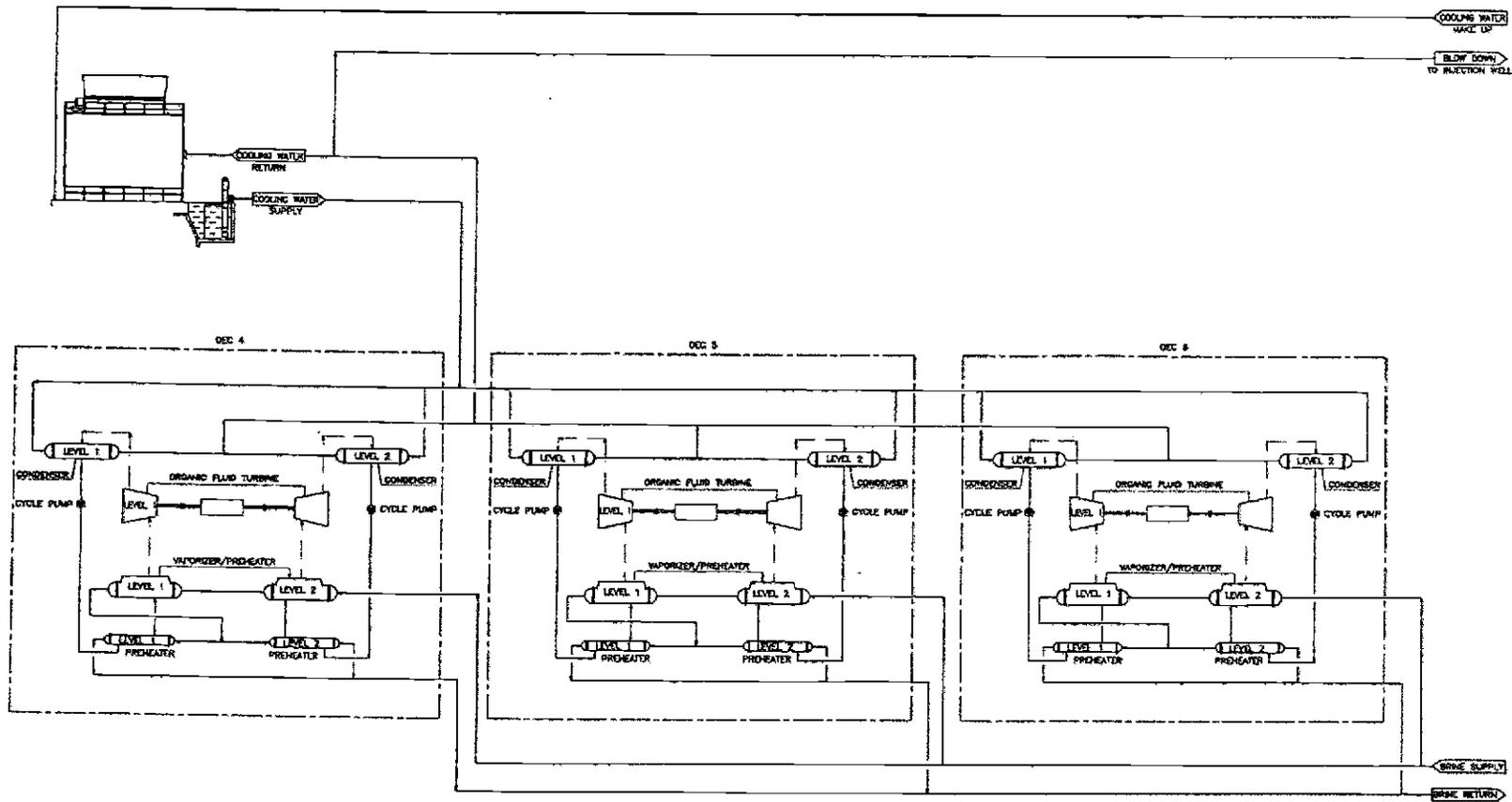


Figure 5: East Brawley Project Power Plant Basic Block Diagram (Sheet 2)

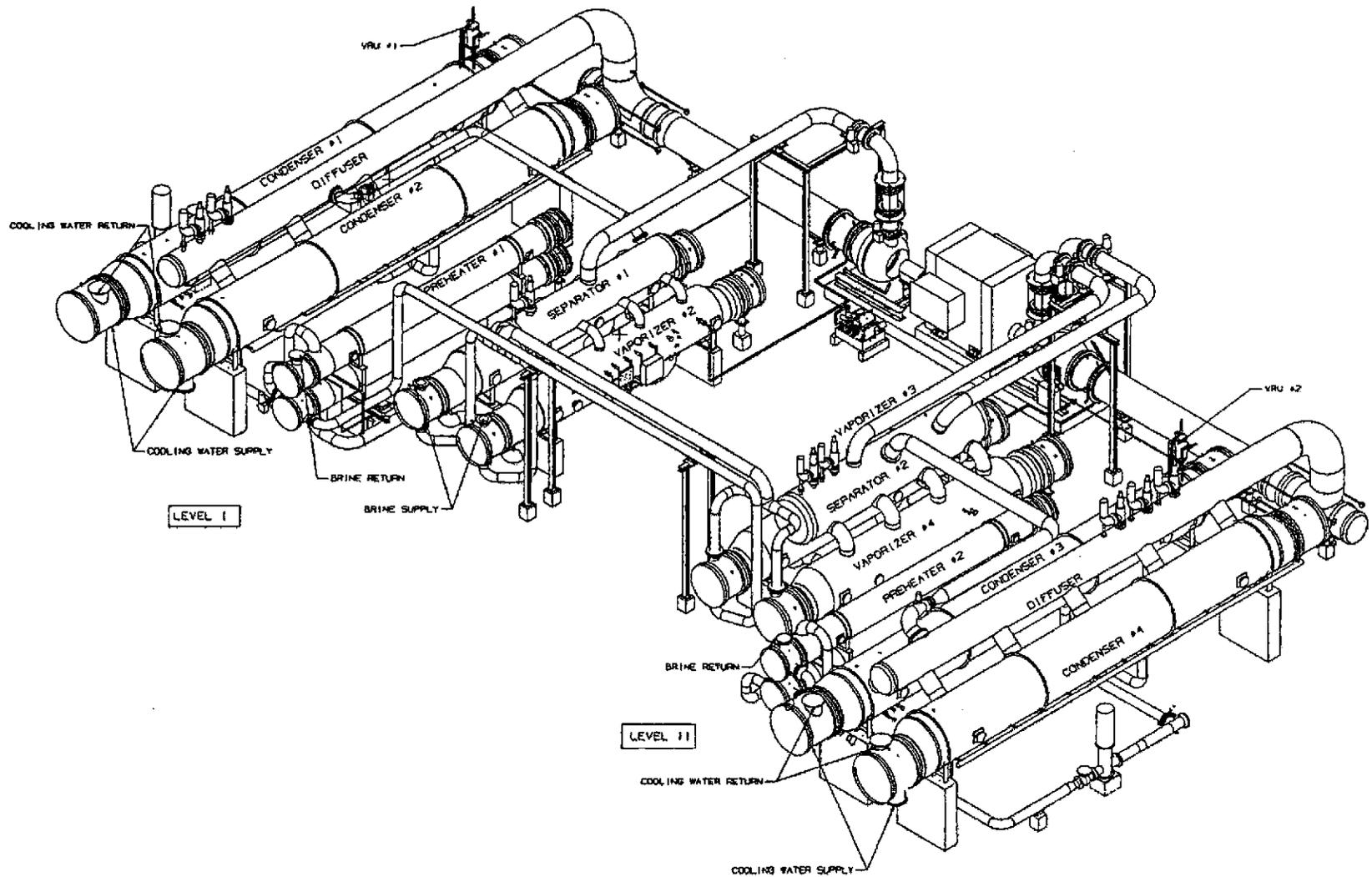
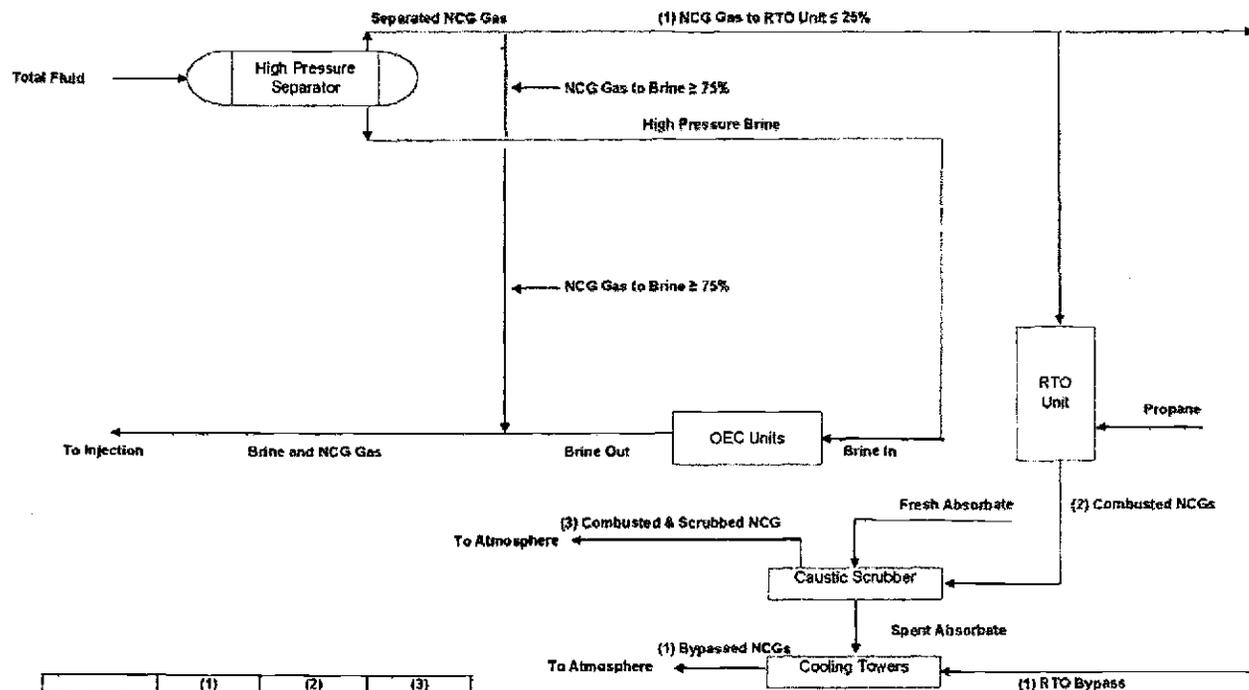


Figure 6: General Arrangement (Perspective View) of Single OEC Unit (One of Six)



	(1) Geothermal NCG to RTO or Bypass (lbs/hr)	(2) RTO Combusted NCG (includes combustion & air) (lbs/hr)	(3) Combusted & Scrubbed NCG (includes combustion & air) (lbs/hr)
C6H6	11.16	0.22	0.22
H2S	2.92	0.06	0.06
NH3	0.35	0.00	0.00
SO2	0.00	5.38	0.13
NOx	0.00	1.03	1.03
PM10	0.00	0.00	0.50
CO	0.00	0.01	0.01
RCCs	11.16	0.22	0.22
Other NCG	28,074.32	45,683.63	45,687.49

Figure 7: East Brawley Noncondensable Gas Separation and RTO Unit/Caustic Scrubber System Process Flow Diagram

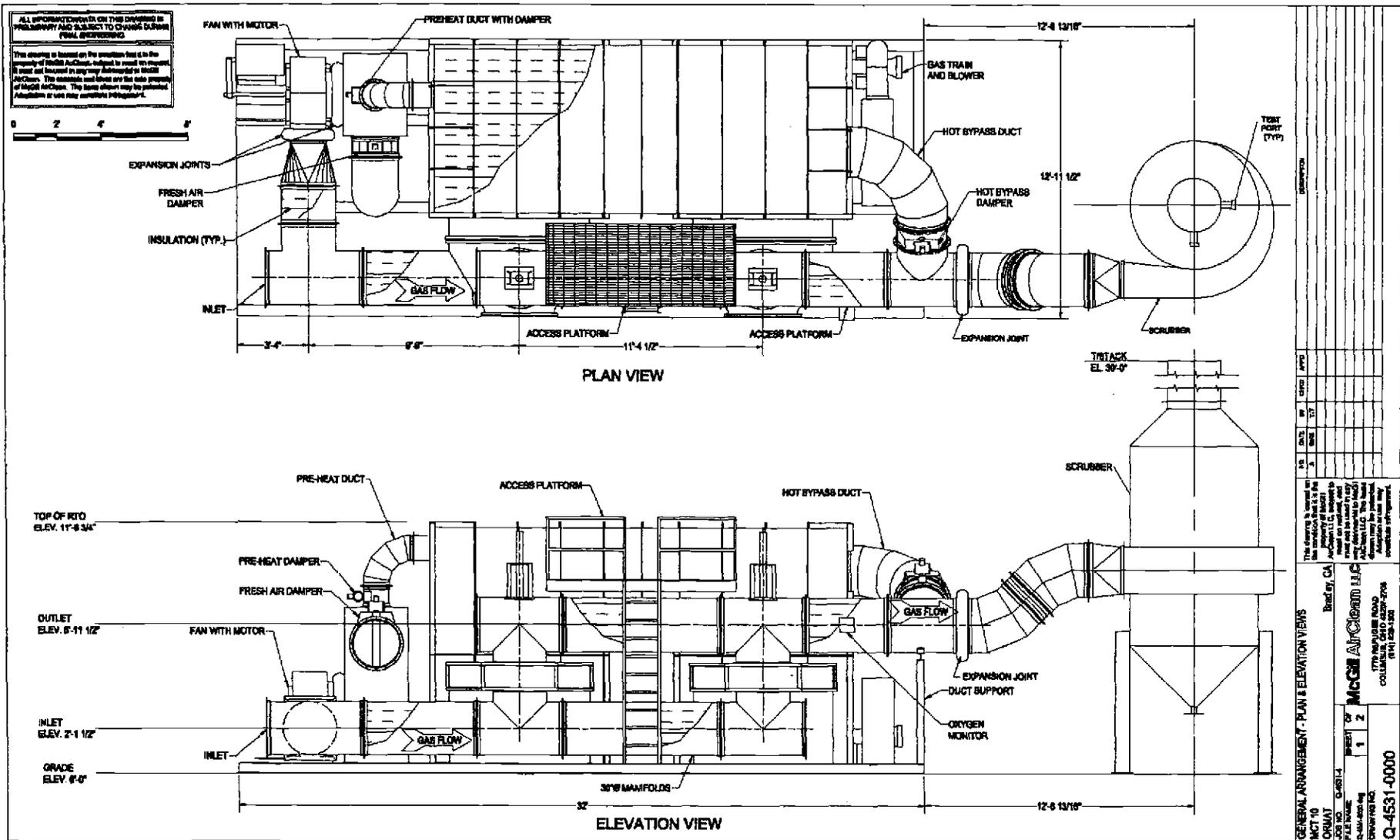


Figure 8: East Brawley RTO Unit/Caustic Scrubber System General Arrangement – Plan and Elevation Views

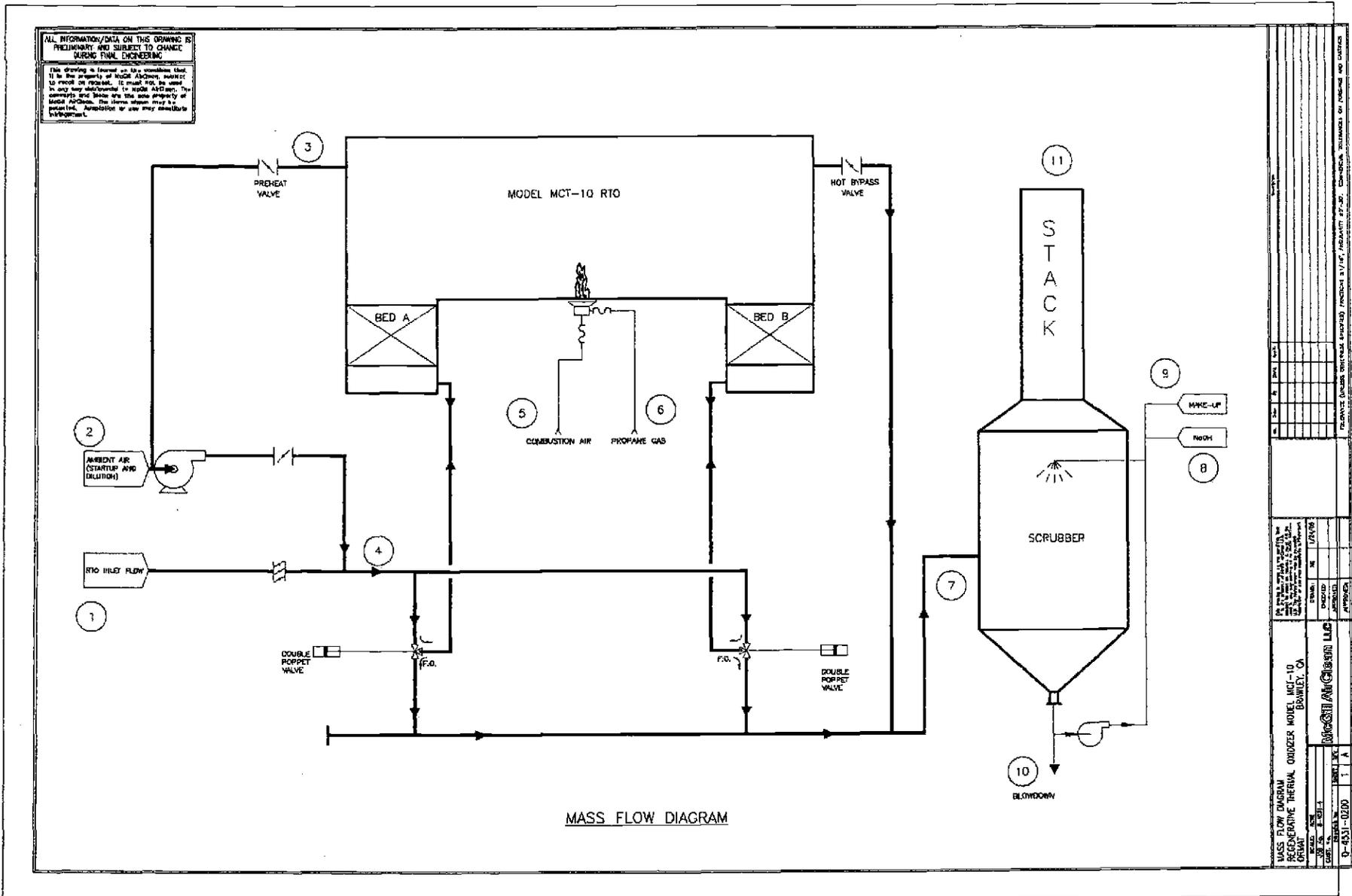
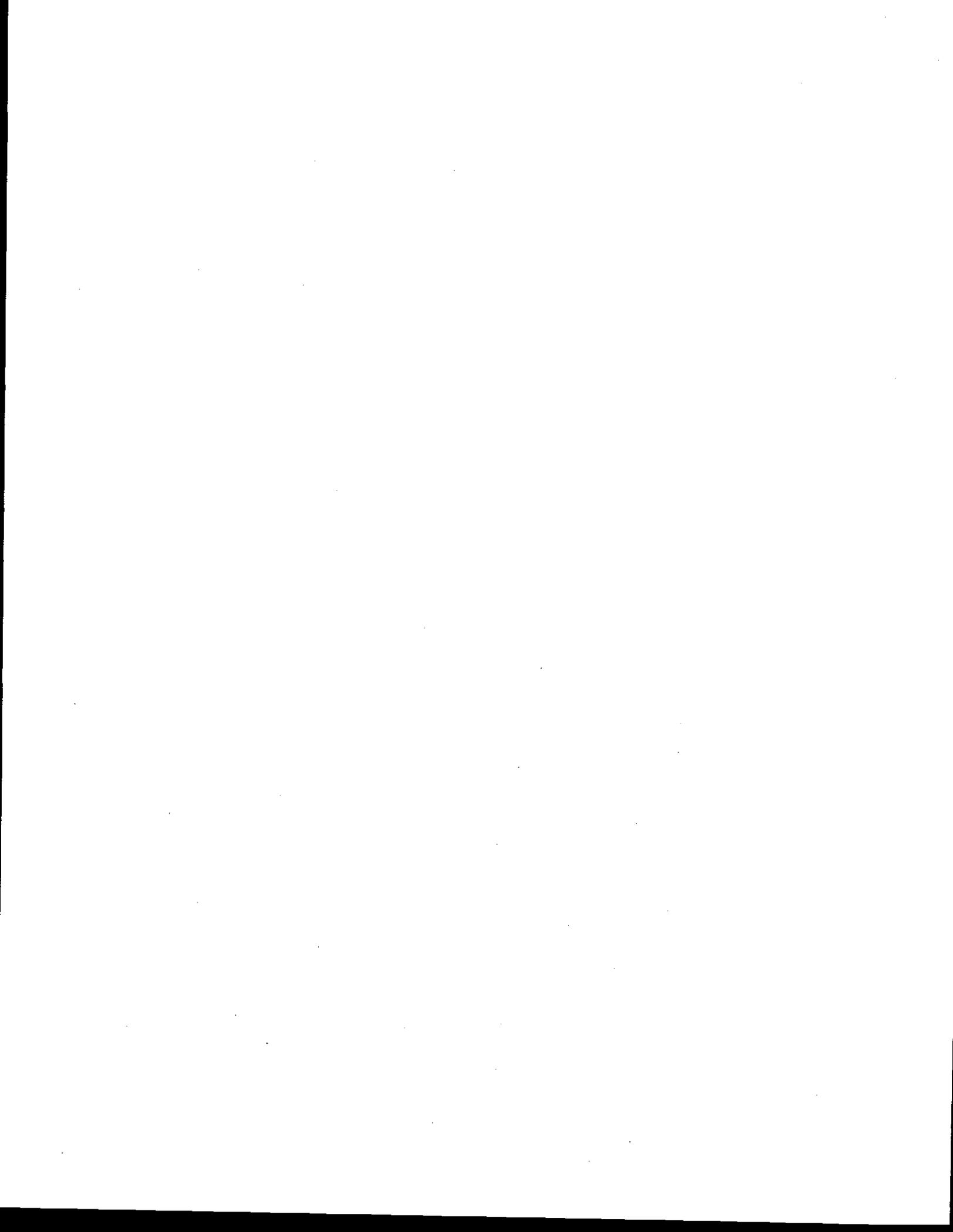
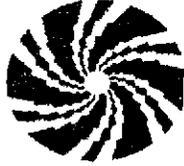


Figure 9: East Brawley RTO Unit/Caustic Scrubber System Process Flow Diagram

Attachment E



ORMAT®



May 12, 2008

Mr. Jurg Heuberger, Planning Director
Imperial County Planning & Development Services
801 Main Street
El Centro, CA 92243

Subject: CUP #07-0017, Request for Amendment

Dear Mr. Heuberger:

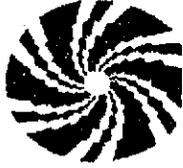
As provided for by Condition G-14 of this CUP, Ormat Nevada Inc. requests a minor amendment to Condition S-1 (a), (c), (d) and (g) for the North Brawley geothermal development project as a result of the exploration wells that were drilled and the additional leases acquired since the initial CUP application was submitted. An amended Authority to Construct application was also submitted to the Imperial County Air Pollution Control District on March 27, 2008 as a result of the flow testing performed on the exploration wells (enclosed). Ormat believes the land use changes described below are environmentally insignificant as compared to the original project description.

1. The original well field layout was based on the known resource data and the leased area. Based on additional lease acquisition the area proposed for this project is larger but the number of wells, either production or injection, remain the same. It is also planned to use well pads for more than 1 well, thus, potentially reducing the number of well pads for the project too. The well nomenclature has been changed from OB to the Kettleman system commonly used on federal lands. A revised map to the one in the CUP application and a revised Table 1 which shows the landowner information along with the new well names are enclosed. Conditional Use Permit application forms, Owner Affidavits and Indemnification Agreements are enclosed for the lands that were added to the project area.
2. Each production well will have a corrosion inhibitor and scale inhibitor container at their location. The container, size and type to be determined, will have secondary containment.
3. Each production well or well pad will have a gas separator to separate entrained gas from the brine. Approximately 25% of the separated gas will be sent to the power plant in a pipeline that parallels the brine pipeline. The balance of the gas will travel to injection wells in a pipeline that parallels the brine pipeline to be injected along with cooled brine from the power plant.

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4. Each production well will have a geothermal fluid booster pump to pump the fluid to the power plant.
5. Each production well will have a sand separator that operates occasionally to remove sand from geothermal fluid. The sand will be collected in tanks for disposal.
6. Two (2) cooling tower blowdown wells will be drilled within the power plant site, 68-17 and 68A-17.
7. The separated gas will go through a gas scrubber at the power plant. See revised power plant site plan and flow diagram. The separated gases will both vented and combined with the cooling tower blowdown for injection.
 - a. The amount of green house gases emitted, methane and carbon dioxide, are less than half of those allowed under AB 32 for new generation in California.
 - b. Hydrogen sulfide emissions will be abated in the gas scrubber to 48 lb/day using sodium hydroxide as required by the Imperial County Air Pollution Control District's (ICAPCD) Rule 207.C.1.c.
 - c. Benzene emissions will be limited to just under 50 lbs/day by combining the gases for injection with the cooling tower blowdown. We believe this meets the intent of ICAPCD Rule 207.C.1.a. for Best Available Control Technology for a nonattainment pollutants or its precursors. The benzene emissions will increase the plant's emissions of nonattainment pollutants to 187 lbs/day; thus, as required by Rule 207 C.2.a. emission offsets will be required for all emissions greater than 137 lbs/day.

Although there have been changes to the Brawley project since it's inception Ormat has strived to redesign a project that not only meets all rules and regulations but provides environmental benefit to Imperial County. The project is in construction and we hope to be commercial by the end of the year. Thank you for your consideration. Please contact me at 775-336-0155 if you have any questions or need more information.

Sincerely,

Charlene L. Wardlow

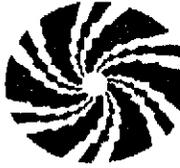
Charlene L. Wardlow
Environmental/Regulatory Affairs Administrator

Enclosures

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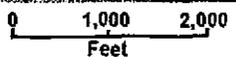
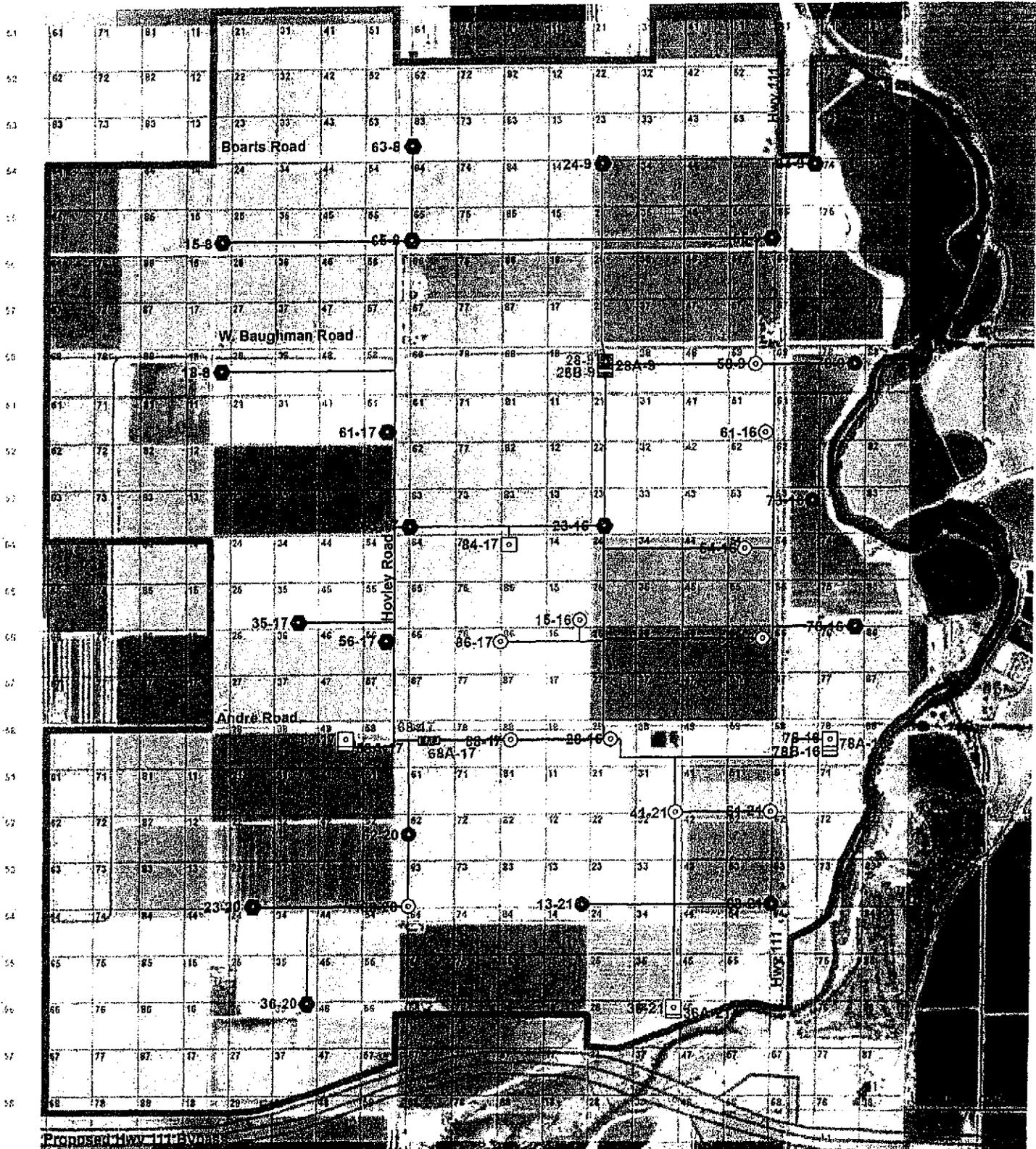
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cc: Brad Poiriez, Air Pollution Control District
Richard Cabanilla, Planning & Development Services
Mario Martinez, Ormat Nevada Inc.
Skip Matlick, Ormat Nevada Inc.
Bob Sullivan Ormat Nevada Inc.

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Project Area Extents
Shown on Figure



LEGEND

- Production Well: ●
- Injection Well: ■
- Geothermal Pipeline: +
- Proposed Production Well: ⊙
- Proposed Injection Well: □
- Proposed Production or Injection Well: ◆
- Blowdown Well: ▣

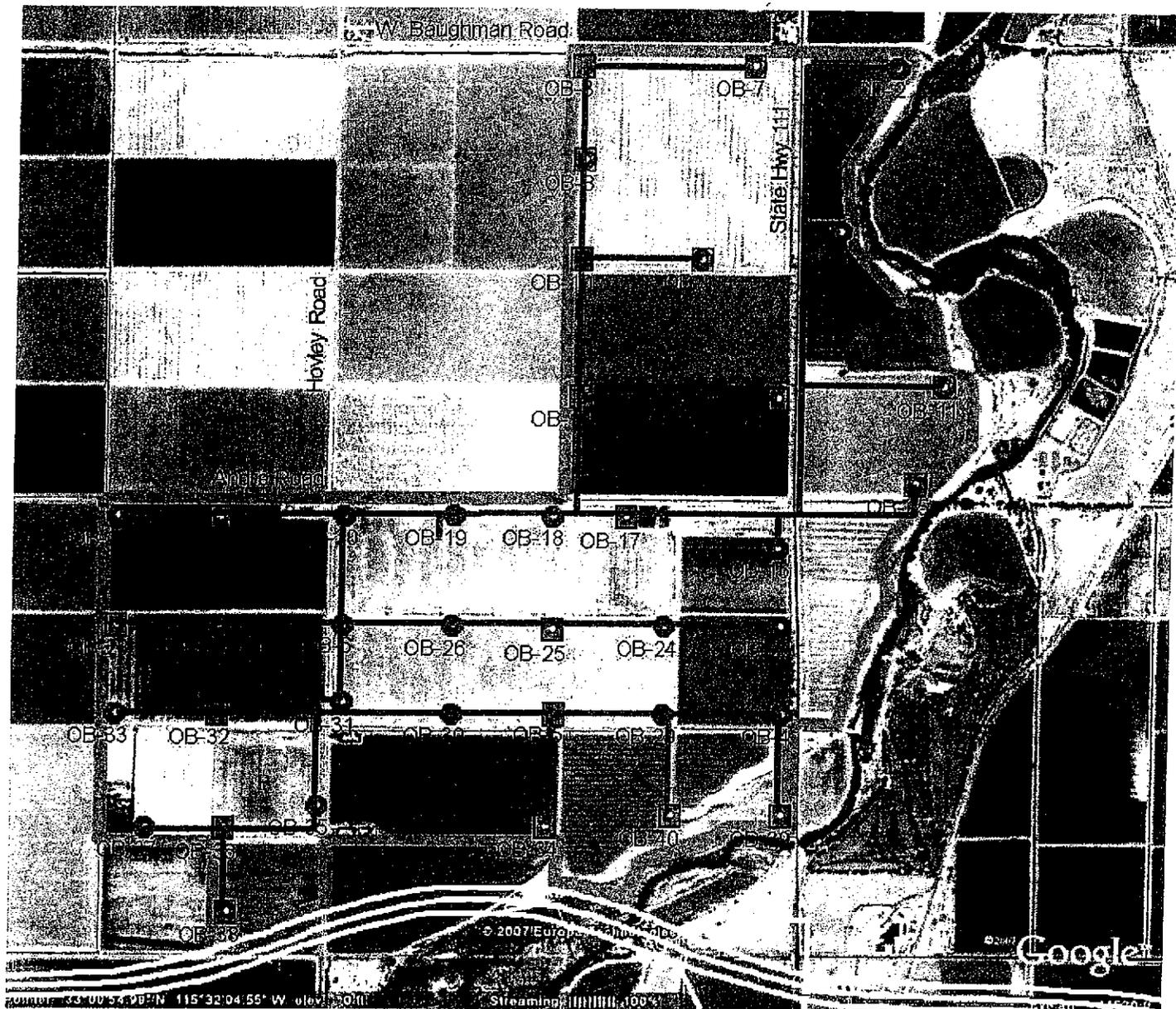
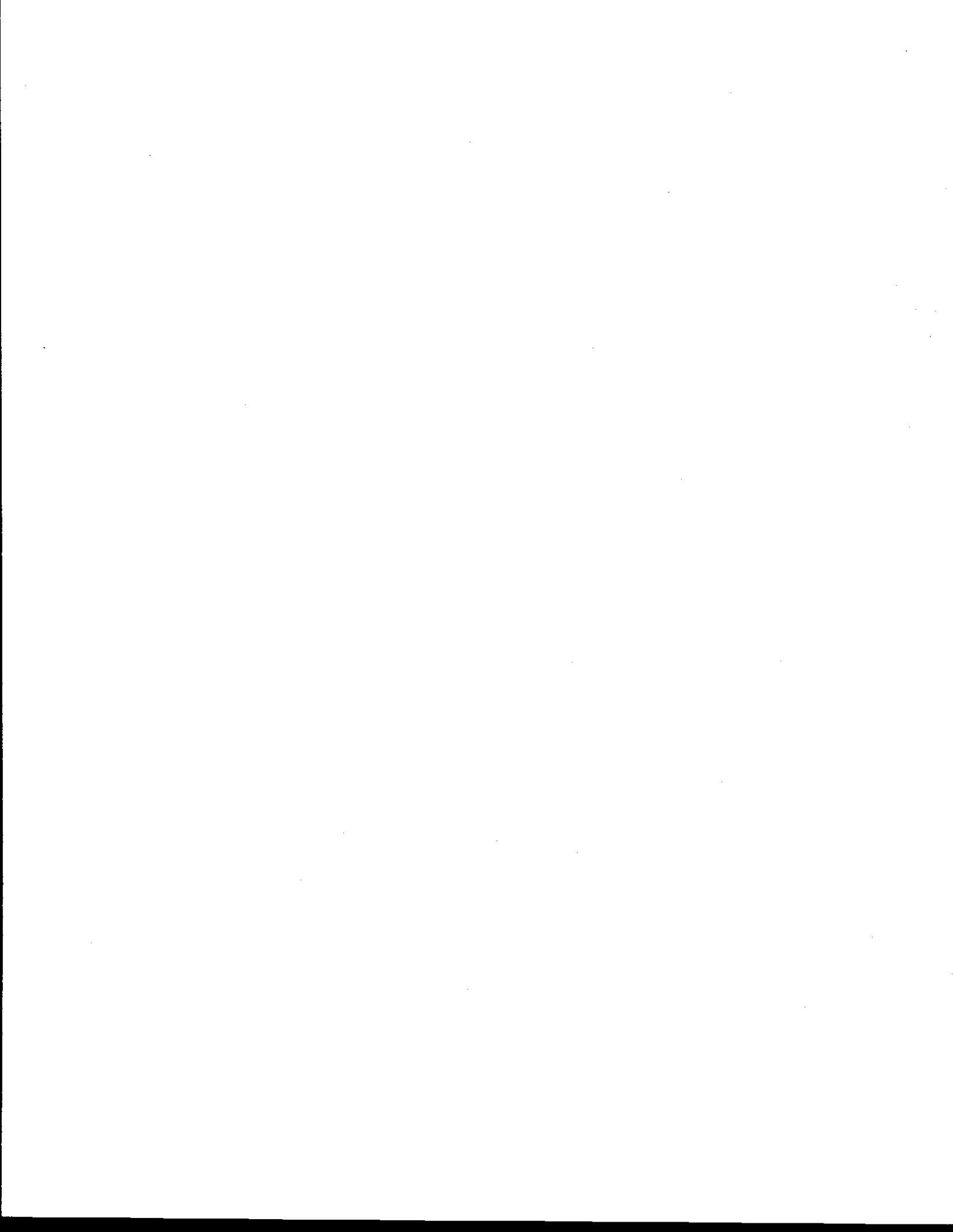
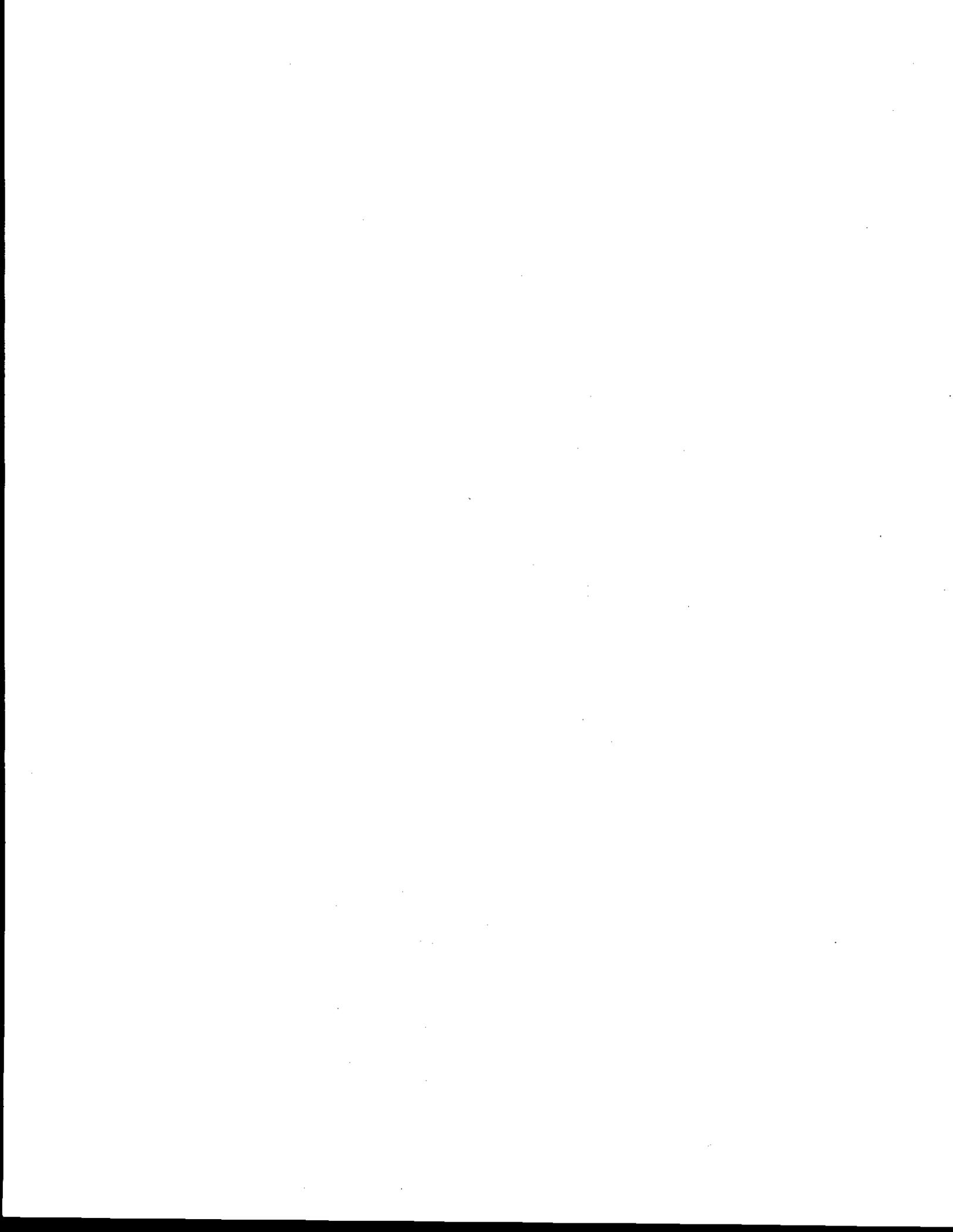


Figure 3: North Brawley Wellfield and Pipeline Systems



Attachment F





IMPERIAL COUNTY

PLANNING & DEVELOPMENT SERVICES

PLANNING / BUILDING INSPECTION / ECONOMIC DEVELOPMENT / PLANNING COMMISSION / A.L.U.C.

May 28, 2008

JURG HEUBERGER AICP, CEP, CBO
PLANNING & DEVELOPMENT SERVICES DIRECTOR

Charlene L. Wardlow
Env. Reg. Affairs Administrator
Ormat Nevada, Inc.
6225 Neil Road
Reno, NV 89511

RECEIVED

MAY 29 2008

ORMAT RENO OFFICE

**Subject: Request for Minor Amendment to CUP #07-0017
APN# 037-130-040-000/North Brawley Binary Plant**

Dear Charlene:

The County Planning and Development Services Department received on May 14, 2008, your request for a "Minor Amendment" to the above permit. The CUP section **G-14, Minor Amendments**, permits the Planning Director to approve minor modifications to the permit on the design, construction and operation of the project. This approval is based upon a determination that the proposed minor changes will not result in any additional environmental impacts.

The proposal is to spread out the binary plant's production and injection islands based on the acquisition of additional leases in the project area. The original well field is proposed to be expanded northward and westward and that ORMAT intends "...to use well pads for more than 1 well, thus, potentially reducing the number of well pads for the project..." ORMAT shall comply with all of the environmental mitigation measures within CUP #07-0017 including the S-6 and S-7 conditions for Archaeological/Cultural/Paleontological Resources and Biological Resources and doing a pre-construction survey for the Burrowing Owl on the proposed new well pads.

If you have any questions, please contact Richard Cabanilla, Planner IV, at (760) 482-4236, extension 4313.

Sincerely,


JURG HEUBERGER, AICP, CEP
Planning and Development Services
Department Director

cc: Darrell Gardner, Asst. Planning & Dev. Services Director
Jim Minnick, County Planning Division Manager
Files: CUP #07-0017/10.101/10.102/10.103/10.105

RC/aa/S: APN FILE 037\130\040\MinorAmendmentLetterORMAT

G-14 MINOR AMENDMENTS:

The Planning Director may approve minor modifications to the permit to accommodate minor changes or modifications to the design, construction, and/or operation of the project provided said changes are necessary for the project to meet other laws, regulations, codes, or conditions of the CUP and provided further, that such changes will not result in any additional environmental impacts.

G-15 SPECIFICITY:

The issuance of this permit does not authorize the Permittee to construct or operate the project in violation of any state, federal, local law nor beyond the specified boundaries of the project as shown the application/project description/permit, nor shall this permit allow any accessory or ancillary use not specified herein. This permit does not provide any prescriptive right or use to the Permittee for future addition and or modifications to the project.

G-16 NON-COMPLIANCE (ENFORCEMENT & TERMINATION):

Should the Permittee violate any condition herein, the County shall give notice of such violation. If Permittee does not act to correct the identified violation and, after having given reasonable notice and opportunity, e.g. typically at least thirty (30) days, the County may revoke the permit.

(a) If the Planning Commission finds and determines that the Permittee or successor-in-interest has not complied with the terms and conditions of the CUP, or cannot comply with the terms and conditions of the CUP, or the Planning Commission determines that the permitted activities constitute a public nuisance, the Planning Director shall provide Permittee with notice and a reasonable opportunity to comply with the enforcement or abatement order;

(b) If after receipt of the order, (1) Permittee fails to comply, and/or (2) Permittee cannot comply with the conditions set forth in the CUP, then the matter shall be referred to the Planning Commission for permit modification suspension, or termination, or to the appropriate prosecuting authority.

G-17 GENERAL WELFARE:

All construction of the project shall be conducted with consistency with all laws, conditions, adopted County policies, plans and the application so that the project will be in harmony with the area and not conflict with the public health, safety, comfort, convenience, and general welfare.

G-18 PERMITS OF OTHER AGENCIES INCORPORATED:

Permits granted by other governmental agencies in connection with the Project are incorporated herein by reference. The County reserves the right to apply conditions of those permits, as the County deems appropriate; provided that enforcement of a permit granted by another agency shall require concurrence by that agency.

Attachment G



Think GeoEnergy – Geothermal Energy News

By Region, By Region, North America, Projects - February 10, 2010

Ormat's North Brawley plant with 17MW short of its 50MW potential

written by: lxrichter



Ormat Technology's North Brawley plant in the Imperial Valley in California is faced with high levels of sand in the geothermal fluid limiting the plant to 17 MW, short of the site's 50 MW potential.

In an article today from the U.S., it is said that "the North Brawley plant in California's Imperial County has encountered delays thanks to high levels of sand in the geothermal fluid. These 'un-dissolved solids' are limiting the plant's capacity; Ormat maintains that the reservoir can support the planned 50MW power plant.

Over the course of 2009, Ormat executives discussed the challenges they faced that North

Brawley. Finding un-dissolved solids in geothermal fluid is not unique to this site, Ormat chief operating officer Yoram Bronicki told analysts in May, "but I think that the magnitude is probably unique".

While the technology to remove sand from water is not breakthrough, it becomes complicated with high-pressure, high-temperature geothermal fluid. The company has not been able to use off-the-shelf water treatment equipment.

It has made 'substantial progress' using temporary measures to manage the un-dissolved solids and can now maintain the 17MW output level at North Brawley, which was estimated to cost in the range of \$300m. Permanent equipment is on order, but even when in place, Ormat may face continued challenges meeting the planned 50MW capacity, in addition to the higher capital costs for fixing the problem.

"[I]t appears that even with the solids in check, the injection capacity of some of the wells is disappointing and the Company is evaluating how to increase the injection capacity and bring the plant to its rated design," Ormat says in a statement. "The Company plans to request the power purchase agreement off taker to extend the firm operation date to the end of the year, which it expects allows sufficient time to bring the power plant to its design capacity of 50MW."

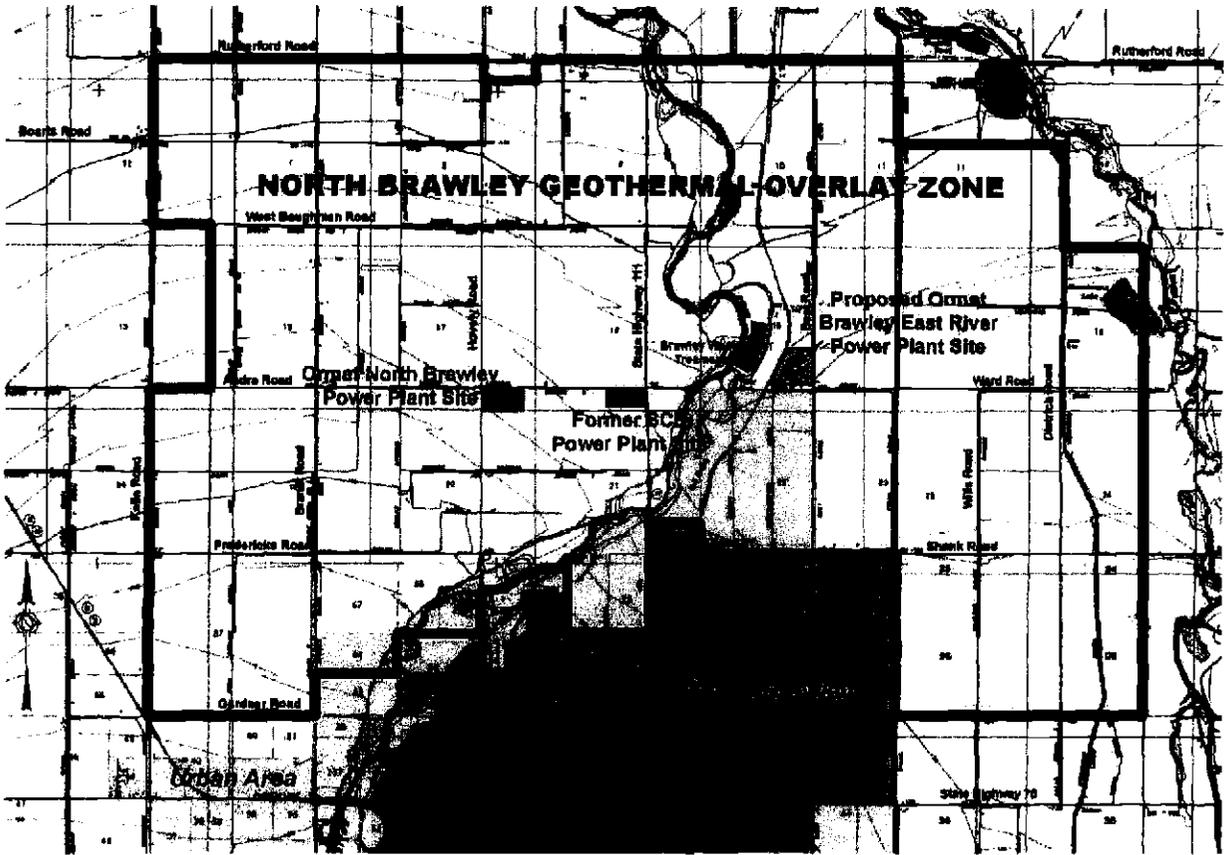
On the bright side, Ormat's approach to removing the sand at North Brawley can be incorporated into the design at the nearby East Brawley site, a 30MW project that is anticipated to face the same problem with un-dissolved solids."

Source: [RECharge](#), [Ormat news piece](#)

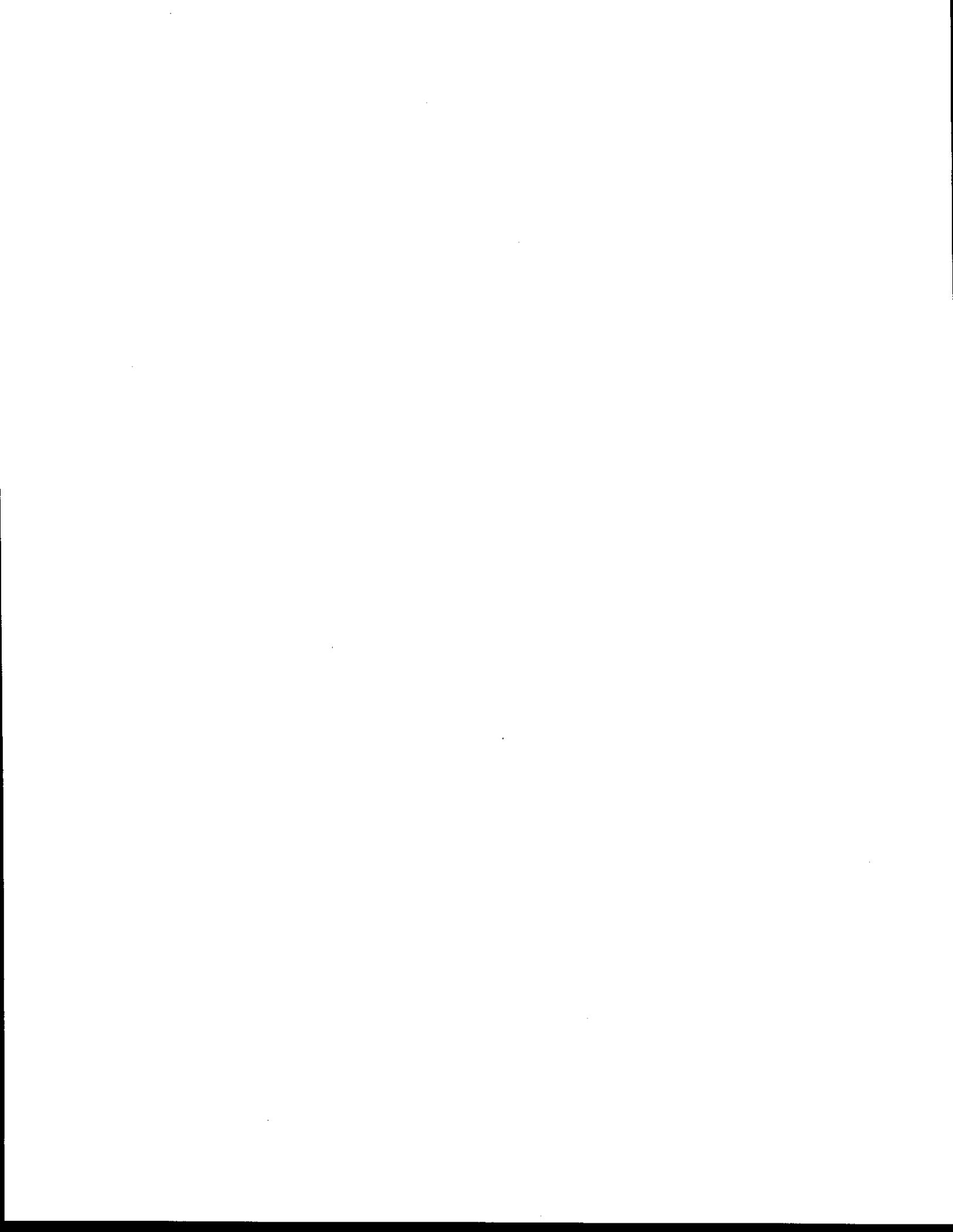
This entry was posted on Wednesday, February 10th, 2010 at 9:27 am and is filed under [By Region](#), [North America](#), [Projects](#). You can follow any responses to this entry through the [RSS 2.0](#) feed. You can [leave a response](#), or [trackback](#) from your own site.

Attachment H

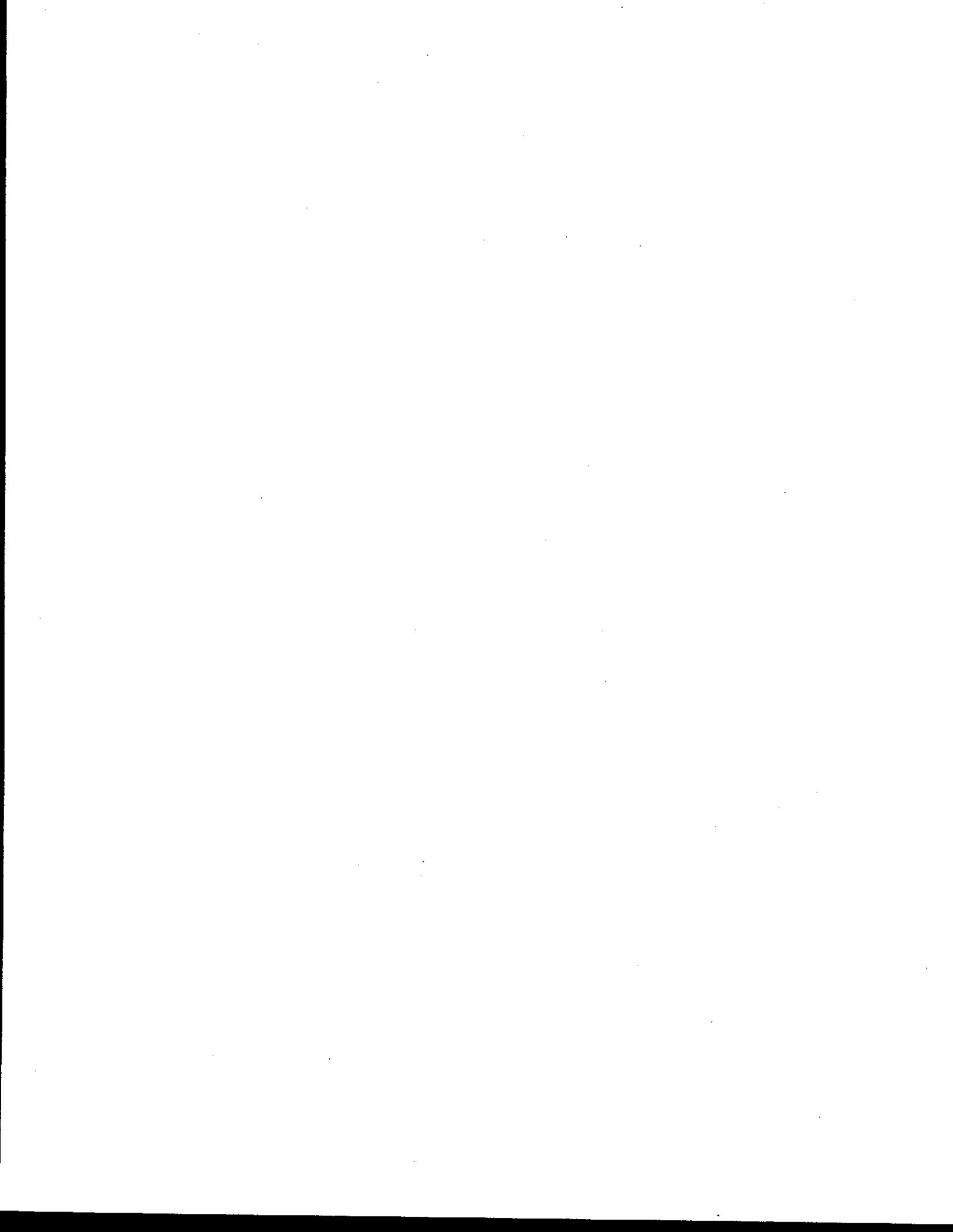




Ormat North Brawley (blue) and East Brawley (pink) power plant sites
 and Brawley Wastewater Treatment Plant (light blue, west of East Brawley)
 (from Draft EIR, Appendix B, Figure 2)



Attachment I





IMPERIAL COUNTY

PLANNING & DEVELOPMENT SERVICES

PLANNING / BUILDING INSPECTION / ECONOMIC DEVELOPMENT / PLANNING COMMISSION / A.L.U.C.

JURG HEUBERGER AICP, CEP, CBO
PLANNING & DEVELOPMENT SERVICES DIRECTOR

October 30, 2008

Charlene L. Wardlow
Director Project Development
Ormat Nevada Inc.
6225 Neil Road
Reno, NV 89511

RECEIVED
NOV 03 2008
ORMAT RENO OFFICE

RE: Conditional Use Permit #08-0023 (East Brawley Facility)
APN: 037-140-006-000

Charlene,

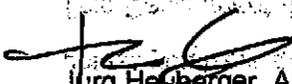
The Imperial County Planning & Development Services Department met with the Imperial Irrigation District (IID) today and discussed Ormat's proposed Geothermal Power Plant commonly referred to as the East Brawley Facility. In our discussion with the IID it was made clear that although IID staff has had one in contact with Ormat, said contact was preliminary and that no water availability contract has been drafted, nor is there one proposed in the near future. As you are well aware, availability of water is critical to the proposed Ormat East Brawley Facility and that absent a water contract with the IID this project is not feasible. That said, unless you have an alternative source of water we cannot proceed.

This Department finds that in order to proceed with the proposed Conditional Use Permit #08-0023 the availability of water will need to be resolved. Therefore, without the water issue resolved, in accordance with the Guidelines for California Environmental Quality Act, (California Code of Regulations, Title 14, Chapter 3, Section 15109) an "unreasonable delay" by the applicant has occurred, in the Department (Lead Agency for CEQA in Imperial County) is unable to complete the CEQA process. Therefore the Department hereby puts Conditional Use Permit #08-0023 on hold until such time that an executed water availability contract between the IID and Ormat is submitted to the Imperial County Planning & Development Services Department.

Additionally, all of the studies including the SB 610 Water supply Assessment previously requested by Department will need to be submitted prior to reactivation of the permitting process.

If you have any questions please contact me at (760) 482-4236 extension 4310 or e-mail me at Jurgheuberger@co.imperial.ca.us.

Sincerely,


Jurg Heuberger, AICP
Planning & Development
Services Director

CC: Darrell Gardner, Assistant Planning Director
CUP #08-0023

Files: 10.101, 10.102, 10.105

MSJH\MS-APN FILES\037140006\CUP08-0023 project on hold lt 10 30 08 Finalized MS.doc

MAIN OFFICE: 801 MAIN ST., EL CENTRO, CA 92243
ECON. DEV. OFFICE: 836 MAIN ST., EL CENTRO, CA 92243

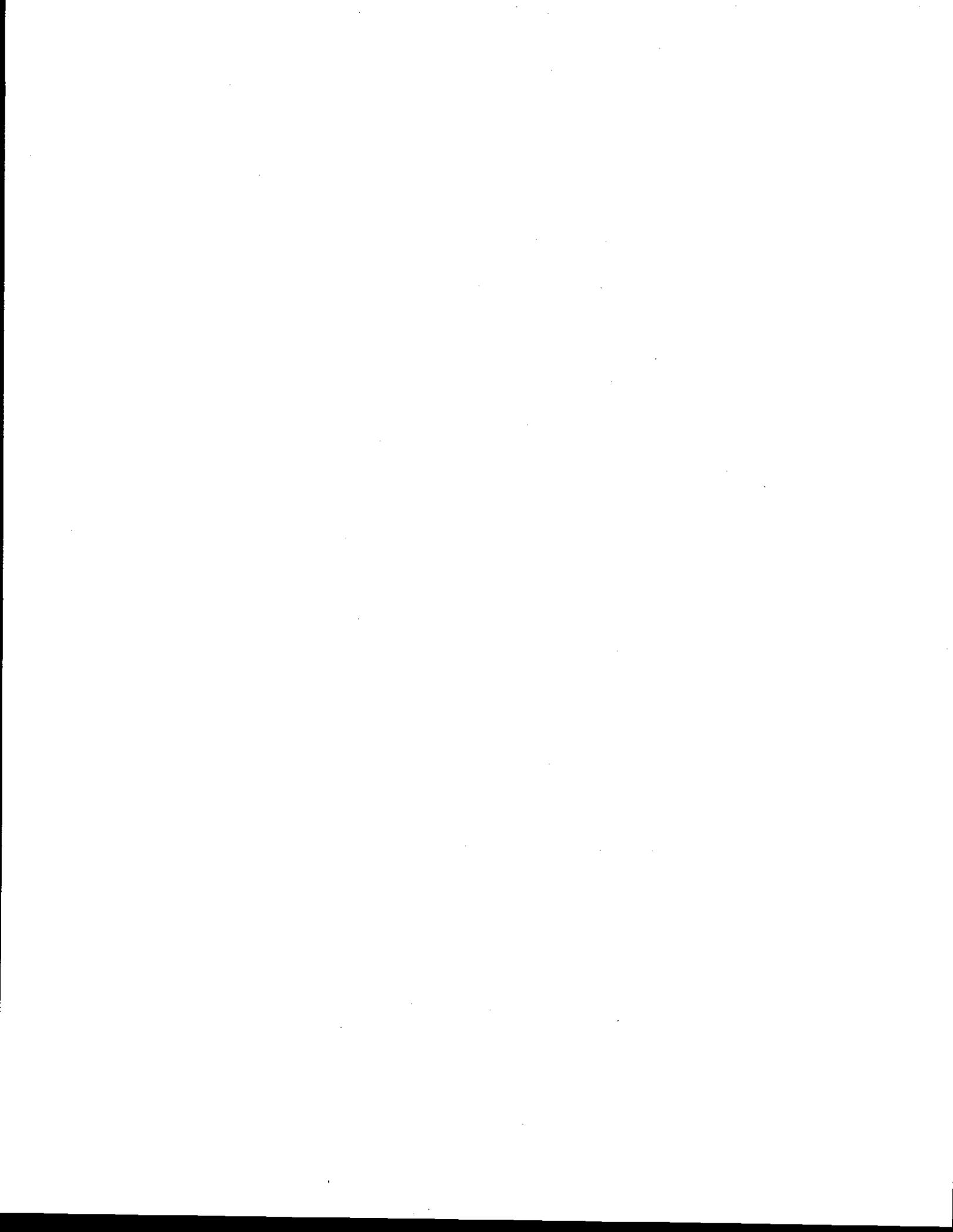
(760) 482-4236
(760) 482-4900

FAX: (760) 353-8338
FAX: (760) 337-8907

E-MAIL: planning@imperialcounty.net
(AN EQUAL OPPORTUNITY EMPLOYER)



Attachment J



**EAST BRAWLEY
GEOTHERMAL DEVELOPMENT PROJECT**

UPDATED PROJECT DESCRIPTION

January 29, 2010

Submitted to:

County of Imperial
Planning & Development Services
801 Main Street
El Centro, CA 92243-2811

Submitted by:

ORNI 19, LLC
Ormat Nevada Inc.
6225 Neil Road
Reno, NV 89511

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**EAST BRAWLEY
GEOTHERMAL DEVELOPMENT PROJECT
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1.0 INTRODUCTION

ORNI 19, LLC, a wholly owned subsidiary of Ormat Nevada Inc. (Ormat), proposes to build the East Brawley Geothermal Development Project in the vicinity of the Brawley 2 Geothermal Exploration Project covered under Conditional Use Permit #07-0029 and the Environmental Impact Report (EIR) for the Geothermal Overlay Zone (g-zone). The project area is north of the City of Brawley in Imperial County, California (see Figure 1).

This Conditional Use Permit application is for the construction of a new 49.9 net megawatt (MW) binary power plant composed of six (6) Ormat Energy Converters (OEC), an expanded geothermal well field beyond the six exploration wells, pipelines to bring the geothermal brine to the power plant, pipelines to take the cooled brine to injection wells, pipelines to distribute noncondensable gases from production wells to power plant area and injection wells, an electric transmission line to interconnect to the substation at the North Brawley 1 Geothermal Power Plant, and a water pipeline to bring water from an Imperial Irrigation District (IID) canal to the power plant for cooling water.

2.0 SUMMARY OF PROPOSED PROJECT

The East Brawley Geothermal Development Project would be located on private agricultural lands just north of the City of Brawley in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, San Bernardino Base and Meridian (SBM). The project is in the g-zone that was covered by the Final EIR dated April 1979 and approved by the Board of Supervisors. It analyzed up to 800 megawatts in the g-zone (see Figure 2). The proposed project is located east of the New River, approximately 1.75 miles east of the North Brawley 1 Geothermal Power Plant along Best Road.

The southern boundary of the project area is just north of the City of Brawley's boundary within their "sphere of influence" and just north of the in-construction Highway 111 bypass in an area zoned M-1 Light Manufacturing. The southwestern boundary of the project is the Del Rio Country Club bounded by the New River. The land to the north and east is agriculture. The eastern boundary of the project is Dietrich Road and to the north Rutherford Road. The majority of the project is along Best Road from Shank to Rutherford Roads. An at-grade intersection will be built at the Highway 111 bypass and Best Road which will provide the best access to the plant site and well field. Well pads may be accessed from the other county roads in the area: Dietrich, Groshen, Rutherford, Ward and Wills. There are also farm and IID canal roads that will be used to access some well locations (see Figure 3).

ORNI 19, LLC/Ormat Nevada Inc. proposes to permit, construct, operate and maintain the East Brawley Geothermal Development Project that would consist of the following facilities:

**East Brawley Geothermal Development Project
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- A 49.9 net MW geothermal power plant consisting of up to six (6) OEC binary generating units (16 MW gross each) with vaporizers, turbines, generators, condensers, preheaters, pumps and piping, motive fluid (isopentane) storage, a motive fluid vapor recovery system (VRU), a gas scrubber, and possibly a regenerative thermal oxidizer (RTO) and related ancillary equipment;
- Two (2) cooling tower batteries with a total of 14-20 cell counter flow, induced draft with drift eliminators of 0.0005 efficiency;
- A control room, office, maintenance shop, parking, and other facilities located at the power plant site;
- Approximately 34 total wells, approximately half for production and half for injection. The final number of wells will be determined by drilling results. Each well will average 4500 feet in depth. Production wells will have a gas separator and corrosion and scale inhibitor and a geothermal fluid booster pump to pump the fluid to the power plant. Each well will also have a sand separator and/or filtration system;
- Piping from production wells to the power plant and from the power plant to the individual injection wells. Gas pipelines will take the gas contained in the brine from the gas separators to either the injection wells or to the gas scrubber at the power plant;
- Blowdown wells (2-4) at the power plant site to provide for injection of the cooling tower blowdown;
- Pumps, tank, valves, controls, flow monitoring and other necessary equipment to the wells and pipelines;
- Maintenance of the production and injection wells cited above;
- Piping, canals or ditches and pumps to bring water from IID's Rockwood Canal to the power plant;
- A pipeline crossing over New River, that would primarily allow connection of geothermal wells located on both sides of the river. This crossing was included in an amendment to the East Brawley CUP application submitted to the County in March 2009, and in Section 5.7 below; and
- A substation with a 2 mile long double circuit 13.8 and 92 kilovolt (kV) transmission line with 66 high poles to interconnect to the IID at the North Brawley 1 substation at Hovley and Andre Roads.

The major components of the proposed East Brawley Development Project, and their function and location are summarized in Table 1.

East Brawley Geothermal Development Project
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Table 1: East Brawley Geothermal Development Facilities Summary

East Brawley Geothermal Development Project Facilities Summary			
Facility	Size	Location	Function
Well pads	Up to 34 well pads (including the four existing exploration well pads) would be about 316 feet by 356 feet in size (~2 acres each). A mud sump/containment basin of about 75 feet x 260 feet x 7 feet deep would be located on each well pad.	Identified well pads from the exploration phase would be utilized to the extent feasible. Additional wells would be drilled as needed to provide adequate production fluid and injection capacity at well sites.	Well pads include all the equipment necessary to operate a well. During development, any additional drilling would occur from the well pads. Well pads also include containment basins for drilling and maintenance of the wells
Production Wells	Inside diameter of the production wells would be approximately 30 inches at the top and would telescope with depth. Wells are expected to average about 4,500 feet deep.	Production wells would be located on the well pads at the well sites shown in. Approximately 17 production wells each on separate well pads are projected.	Production wells flow geothermal fluid to the surface that is then transported via above ground pipelines to the power plant to generate electricity.
Injection Wells	Injection wells would be the same size as production wells.	Injection well locations have not yet been designated but would be among the well sites. Up to 3 injection wells could be located on each pad. A total of 17 injection wells each on separate well pads are projected.	Injection wells are used to inject spent geothermal fluid from the power plant back into the geothermal reservoir. Injection ensures the longevity and renewability of the geothermal resource.
Geothermal Production Fluid Pipeline	The pipeline system would vary in insulated diameter from 8 to 30 inches depending on individual well productivity. Up to about 9 miles of production pipeline could be constructed.	The piping system would connect the wells to the power plant. The production fluid pipeline would be located within the pipeline corridors.	Geothermal fluid would be transported from the production wells to the power plant via the geothermal production fluid pipeline.

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East Brawley Geothermal Development Project Facilities Summary			
Facility	Size	Location	Function
Injection Fluid Pipeline	The injection piping system would vary in insulated diameter from 8 to 30 inches. Piping would extend from the power plant to the injection wells. Up to about 9 miles of injection pipeline could be constructed.	The injection pipeline would be located among the pipeline routes.	Cooled geothermal fluid would be transported from the power plant to the injection wells via the injection fluid pipeline where it would be injected into the geothermal injection reservoir.
Access Roads	Access roads would be no less than 10 feet wide.	Access roads would extend from existing County roads to the well pads. Existing farm roads would be used to the extent practical. Access roads developed for exploration would be used for any wells and pads that are used for development. Where new pads are created, new access road would be developed.	Access roads are used during development to construct the production wells and install equipment. During utilization, access roads are used for accessing wells for maintenance.
OEC Units	Six, 16 MW (gross) OEC units (manufactured by Ormat Turbines, Ltd.) comprised of vaporizers, turbines, generators, condensers, preheaters, pumps, and piping.	The modular OEC units would be located on the power plant site.	The OEC units are the proprietary modular binary geothermal power generation equipment used on the power plant site.
Motive Fluid Pressure Vessels	The motive fluid would be stored in two, 11,880-gallon pressure vessels.	The motive fluid pressure vessels would be located on the power plant site.	The motive fluid pressure vessels would be used to store isopentane for use in the OEC units.
Vapor Recovery Unit	The vapor recovery unit consists of a diaphragm pump, a vacuum pump, and activated carbon canisters.	The vapor recovery unit is located on the power plant site.	The vapor recovery unit would provide a mechanism to minimize emissions of isopentane from the OEC units during maintenance.
Substation	The substation would occupy a site about 150 feet by 150 feet in size (about 0.5 acres).	The substation would be located adjacent to the power plant.	The substation converts power generated from the plant to the proposed line voltage, 92 kV.

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East Brawley Geothermal Development Project Facilities Summary			
Facility	Size	Location	Function
Interconnection Transmission Line	There would be a new two-mile long double circuit 13.8- and 92-kilovolt (kV) interconnection transmission line with 66-foot high poles.	The interconnection transmission line would connect to the IID grid at the North Brawley 1 substation at Hovley and Andre Roads. The new line would span the New River. One proposed route and one alternative route are under consideration.	The interconnection transmission line would transfer the electricity generated by project to the existing power grid for distribution.
Noncondensable Gas Distribution Line	The noncondensable gas distribution line would range from 4-8 inches in diameter. Up to about 4.3 miles of pipe could be constructed.	Noncondensable gas distribution lines would run from well pad separators and power plant site separators to the injection wells.	Noncondensable gases from separators and other equipment would be compressed and injected into the subsurface reservoir.
Regenerative Thermal Oxidizer (RTO) and Caustic Scrubber	The top of the scrubber would be about 30 feet high.	The RTO/scrubber is located adjacent to the power plant.	The RTO/scrubber unit is BACT for the abatement of potential NCG emissions
Cooling Tower	Two cooling tower units (each with seven to ten cells), would be used (manufactured by Cooling Tower Depot, Inc.). The cooling towers would be the largest and most prominent facility on the power plant site (about 54 feet in height).	The cooling towers would be located on the power plant site.	The cooling towers would provide cooling water to condense the motive fluid vapor in the condensers.
Water Conveyance System	The water conveyance system would be a 10 - 24 inch pipeline, about one mile in length, for water coming from IID source. See text for alternatives to IID water.	Water intake from the IID Rockwood Canal Gate 131 would be either underground or put inside of the Livesley Drain that runs between the canal and the power plant site. See text for alternatives to IID water.	The water conveyance system would provide makeup water for the cooling tower at the power plant site.
Blowdown Wells	Two to four cooling water blowdown injection wells would be constructed similar to the geothermal injection wells.	The blowdown injection wells would be located adjacent to the power plant.	The dedicated blowdown wells are used to inject cooling water blowdown to reduce the concentration of dissolved solids in the cooling water.

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East Brawley Geothermal Development Project Facilities Summary			
Facility	Size	Location	Function
Power Plant Site and Common Facilities	The power plant would occupy about 15 acres of the 30-acre parcel on which it would be located.	The power plant would be located on private land owned by ORNI 19, LLC.	The power plant site is the physical location where electricity would be generated using modular OEC binary geothermal power plant technology.
Control Room, Office and Maintenance Shop	The footprint of these facilities is depicted on Figure 5.	Each of the facilities would be located on the power plant site.	These habitable structures would be used to control, manage and maintain the project operations.

Construction would commence soon after the CUP is issued. Construction of the power plant would require approximately 15 months. Construction would require up to 200 workers at peak construction. Well drilling, pipeline construction, interconnection transmission line construction, and construction of the power plant would all be concurrent.

3.0 PROJECT LOCATION AND ACCESS

The project area is located within Imperial County, California, about 12 miles southeast of the Salton Sea and 25 miles north of the U.S. border with Mexico (Figure 1). The project is within the North Brawley Geothermal Overlay Zone and the Brawley KGRA, in the Imperial Valley, California (Figure 2). The geothermal overlay zone is a zoning classification developed by the County of Imperial to facilitate development and utilization of geothermal resources in areas of identified geothermal development potential.

The project area is comprised of multiple geothermal leases overlaying privately owned cultivated properties in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, San Bernardino Base and Meridian (SBB&M).

The project is comprised of a power plant and a wellfield; the specific locations of each of these are described below.

3.1 Location and Access of Power Plant

The East Brawley Geothermal Power Plant would be located on private agriculture lands in the southeast corner of Section 15, Township 13 South, Range 14 East, SBB&M identified by Assessor's Parcel Number 037-140-06-01. This is located about one mile north of the City of Brawley. The total property size is 32.81 acres and will not be subdivided. The power plant area will be enclosed by a 6 foot wire fence in an area approximately 900 by 600 feet not including the substation or stormwater retention basin. The house that is currently on the property is vacant and will be demolished as part of project construction activities. A house across the street

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will be vacated and also demolished during construction and prior to the delivery of isopentane to the new plant,

Access to the power plant will be on Best Road just north of Ward Road from a left hand turn pocket built for this project (see traffic study). Best Road will be widened by about 20 feet in this section to accommodate a northbound left turn lane at the entrance point. The necessary tapers are provided, based on 55 mph design, which represents the Prima Facia speed limit, the design speed for the road and Caltrans design criteria. It will be necessary to cover Best Canal along the property frontage to accommodate widening of the road for the turn pocket.

The emergency access will be from Best Road into the south end of the property on the north side of the Livesley Drain. The emergency access road will be constructed with an all-weather surface and lead to a locked gate that can be opened by any emergency responders.

Both of the entrances into the plant site provide excellent access from the new Highway 111 bypass that will include an exit onto Best Road just south of Shank Road. Traffic will come from Interstate 8, north on Highway 111 to Best Road.

3.2 Location and Access of Well Field

The East Brawley geothermal wellfield is laid out in a grid pattern over much of the project area. The power plant site would be centrally located within the wellfield in Section 15. The well field will be located between Rutherford Road on the north, Dietrich Road on the east, the New River on the west, and just north of Shank Road on the south. Access to the wellpads and pipelines will be from Best, Baum (not a county road), Groshen, Kerhsaw, Rutherford, Ward, and Wills Roads. Additionally, farm and IID roads may be used for access. Encroachment permits for ingress/egress and irrigation canal and drain crossings would be obtained from the Imperial County Public Works Department and IID as applicable.

Access to farm land would be coordinated with the landowners to minimize impacts to the farming operations. The wellpads and pipelines will be along the edges of the fields. New access roads would be constructed or improved only as needed to safely accommodate traffic required for wellpad construction, well drilling and well and road maintenance. Road widths to well pads would typically be no less than ten feet wide.

4.0 DESCRIPTION OF POWER PLANT

The proposed power plant can be described as having four interdependent operating systems: (a) the geothermal fluid system; (b) the motive fluid system and fire suppression; (c) the geothermal NCG and RTO/gas scrubber system; and (d) the cooling water system. Each of the OEC units would be able to operate independently but would share common ancillary components such as isopentane storage, geothermal brine supply and injection equipment, cooling towers, substation, etc. Each of the power plant systems are described below.

4.1 Geothermal Fluid System

Geothermal fluid from the geothermal reservoir at about 4,500 feet below the surface would be pumped to the surface from the geothermal production wells. At the surface the geothermal fluid would be transported from the well field via a pipeline system to the power plant site. At the power plant site the produced geothermal fluid would be directed to flow through the six proposed OEC units. The geothermal fluid system is a closed loop system. The geothermal fluids from the production wells would be transported to the power plant site and would flow through the level 1 and level 2 vaporizers and preheaters of each OEC unit, transferring the heat to the isopentane motive fluid through the OEC's shell and tube heat exchangers. The cooled or spent geothermal brine would then be sent to the geothermal brine injection system without coming into contact with the atmosphere.

4.2 Motive Fluid System and Fire Suppression

The OEC is a power generation unit which converts low and medium temperature heat energy into electrical energy. Each OEC unit is an integrated closed cycle vapor turbo-generator system that recycles an organic motive fluid in a fully closed loop with no discharges to the environment. The OEC unit operates in a standard power generation cycle (Rankine cycle) similar to the power generation cycle used in a steam turbine.

The motive fluid selected for the East Brawley Project is isopentane. Isopentane is a flammable, but nontoxic, petroleum hydrocarbon that vaporizes at relatively low temperatures under most atmospheric conditions. The isopentane is circulated through the OEC unit. Heat from the geothermal fluid would be transferred via heat exchangers to vaporize the isopentane in a two-level series of preheaters and vaporizers. The vaporized isopentane would be directed through turbines which rotate generators converting mechanical energy into electricity.

On the backside of the turbine-generators the isopentane vapor would be cooled and condensed back to liquid form in water-cooled condensers. The liquid isopentane would then be returned to a storage tank where it would be cycled back to the OEC units again for reuse. The spent geothermal fluid would be transported on the surface via pipelines to injection wells in the well field where it would be pumped back into the subsurface geothermal reservoir.

The generated electricity would be transformed into line voltage and delivered via an interconnection transmission line to a local utility power grid for distribution. ORNI 19, LLC is negotiating a power purchase agreement (PPA) for sale of the energy generated by the project with a major California utility.

The vaporized isopentane motive fluid from the level 1 and level 2 vaporizers would turn the level 1 and level 2 turbines which together turn a common generator that produces the electricity that is delivered to the substation where it is delivered to the transmission lines. The vaporized isopentane is then condensed in a shell and tube condenser and returned to the preheaters and vaporizers to repeat the cycle. The isopentane motive fluid is therefore also circulated within a closed-loop system, with no significant, routine release or discharge of isopentane.

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The isopentane motive fluid system includes the isopentane side of the OEC Units, two (2) 11,880-gallon isopentane pressure vessels, and an OEC vapor recovery unit (VRU) on each OEC condenser. A vapor recovery unit would be used during major maintenance activities on any of the OEC Units.

Each OEC Unit contains approximately 23,000 gallons of isopentane (in the vaporizers, preheaters, condensers and piping). In each OEC, the motive fluid system is designed as a closed-loop, although there would be minor fugitive leaks from the valves, connections, seals, and tubes. Isopentane from these leaks would be released to the atmosphere or would leak into the geothermal or circulating cooling water lines. Operators would frequently inspect the OEC Units leaks and visual signs of fugitive emissions. Isopentane leak detectors are utilized throughout the facility and continuously monitored.

Any noncondensable gases in the air or water which may leak into the isopentane system would eventually collect in the OEC condenser and reduce the efficiency of the OEC Unit. In order to remove these noncondensable gases, each OEC condenser would have a small (~0.106 scf/hr) OEC VRU. Each OEC VRU would consist of two chambers and a set of isolation valves. Operation of each OEC VRU would be controlled by the power plant computer control system, which would start the OEC VRU noncondensable gas "purge" sequence whenever the efficiency of the OEC Unit fell below a set point. During "purging," nearly all of the isopentane vapors in the OEC VRU would be compressed into liquid isopentane and returned to the OEC Unit, while the noncondensable gases, together with some small quantity of isopentane vapors, are discharged to the atmosphere.

Some major maintenance activities require that at least a portion of an OEC Unit be cleared of isopentane motive fluid liquid and vapors prior to performing the maintenance activities. To control and minimize isopentane emissions during these maintenance activities, the liquid isopentane is drained from the section of the OEC Unit (preheater, vaporizer or condenser) to be maintained or repaired and transferred to another portion of the OEC Unit, the isopentane storage tank, or another OEC Unit. A vacuum pump would then be used to evacuate and compress most of the remaining isopentane vapors, returning the isopentane liquid to the OEC Unit. Those isopentane vapors which do not condense would be released through the isopentane vapor recovery unit, which would adsorb nearly all of the remaining isopentane vapors.

To reduce the risk of fire, isopentane vapor and flame detectors connected to the power plant computer control system are placed at strategic locations around the OEC Units to quickly alert the plant operators to any such hazardous situations. The fire protection system would include an approximately 2,500-gpm diesel firewater pump. Water nozzles/monitors would be placed at the power plant site to be used to minimize the risk of a fire spreading should one start within the power plant. A Risk Management Plan would be prepared for this facility for isopentane.

4.3 Noncondensable Gas and Regenerative Thermal Oxidizer/Gas Scrubber

NCGs are naturally occurring gases in the geothermal fluid that are not easily condensed by cooling. They are predominantly (99.9%) made up of nitrogen, carbon dioxide and methane. The NCG separated from the geothermal production fluid would be compressed and injected back

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into the geothermal reservoir with the spent geothermal fluid. Under very high NCG content in the geothermal production fluid conditions, some of the NCG may be treated in a regenerative thermal oxidizer (RTO) and gas scrubber system to remove air pollutants from the NCG before venting the scrubbed NCG to the atmosphere.

Each of the production wells would deliver geothermal fluid to the power plant through production pipelines. The geothermal fluids would first flow from the production wells through closed, high-pressure well pad separators which would separate most of the geothermal noncondensable gases from the geothermal brine. If the quantity of geothermal noncondensable gases in the geothermal fluid is less than the high end of the possible range, all of these separated geothermal noncondensable gases would flow through other dedicated pipelines to the power plant site, to be dissolved or entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. Small quantities of these separated geothermal noncondensable gases would be discharged to the atmosphere along the dedicated pipelines as condensate, created as the gases cool, is drained from the pipeline.

However, if the quantity of geothermal noncondensable gases in the geothermal fluid is at the high end of the possible range, up to twenty-five percent of these separated geothermal noncondensable gases would flow through other dedicated pipelines to the RTO unit/caustic scrubber system located at the power plant site. The remaining seventy-five percent of the separated geothermal noncondensable gases would flow through the dedicated pipelines to be dissolved or entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. As described above, small quantities of these separated geothermal noncondensable gases would be discharged to the atmosphere along the dedicated pipelines as condensate created as the gases cool is drained from the pipeline.

Up to twenty-five percent of the geothermal noncondensable gases separated at each of the well pads would be delivered through dedicated noncondensable gas pipelines to the RTO unit/caustic scrubber system located at the power plant site. The proposed RTO unit would receive the noncondensable gases from the noncondensable gas pipelines. These gases are expected to contain sufficient hydrocarbons and oxygen (with supplemental air and a small amount of propane) to support complete combustion. Propane would also be used to pre-heat the RTO unit during cold start-ups.

The RTO unit would oxidize the hydrocarbons in the NCGs and supplemental propane to carbon dioxide and water vapor in an exothermic process.

The RTO unit would initially combust, and then abate, at least 97 percent of the benzene, methane and other hydrocarbons in the NCGs it receives. It is considered Best Available Control Technology (BACT) for the abatement of hydrocarbons and volatile organic gases in a wide variety of applications. The RTO unit would also oxidize at least 97 percent of the hydrogen sulfide in the NCGs delivered to the RTO unit. The oxidation of hydrogen sulfide in the RTO unit would produce sulfur dioxide (SO₂) and water vapor. The resulting SO₂ emissions would be controlled by the caustic scrubber.

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The low temperature combustion in the RTO unit is flameless and, thus, would not create appreciable nitrogen oxides (NOX) from the oxidation of atmospheric nitrogen.

The proposed caustic scrubber would receive the carbon dioxide, water vapor, sulfur dioxide, nitrogen oxides and other gases produced from the oxidation process in the RTO unit (as well as the gases passing through the RTO unit unoxidized). Before entering the caustic scrubber, the hot gases would be cooled through a direct contact quenching process. The quenched gases would then proceed to the caustic scrubber, where they would be subjected to counter-flows of caustic absorbate (water and sodium hydroxide). The caustic absorbate reacts with the sulfur oxides in the quenched gases to produce sodium sulfates and sulfites, both water-soluble compounds that are dissolved in the caustic scrubber water and piped to a storage sump at the bottom of the scrubber. The remaining gases from the RTO unit are vented out the top of the caustic scrubber through a 30-foot tall stack. The small quantity of spent absorbate would be drained from the storage sump and piped to one of the cooling towers. Fresh absorbate would be added as needed to make up for the loss of exhausted absorbate. The caustic scrubber would remove at least 97.5 percent of the sulfur oxides in the gases it receives. It is considered Best Available Control Technology (BACT) for the control of sulfur dioxide.

A control panel with a programmable logic controller would be used to provide monitoring and control of the RTO unit/caustic scrubber system. RTO unit/caustic scrubber system scheduled maintenance would be coordinated with the maintenance schedule for the East Brawley power plant. The RTO unit/caustic scrubber system would operate at least 95.9 percent of the hours the power plant is operating (equivalent to operating 8,400 hours per year if the power plant operates 8,760 hours per year). When the RTO unit/caustic scrubber system is undergoing unscheduled maintenance or otherwise not operating, the geothermal NCGs would bypass the RTO unit/caustic scrubber system and would be delivered to the cooling towers for release to the atmosphere unabated.

4.4 Cooling Water System

The cooling water system would consist of cooling towers using standard wet cooling tower technology. Cooling water would be used to cool the motive fluid in the condensers and would cycle back to a cooling tower where the water would be cooled, stored and made available for reuse as system process water.

A simplistic diagram of the geothermal system processes minus the NCG and air emission abatement system is schematically represented in Figure 4.

The isopentane vapor condensate is cooled by water circulating from the cooling tower through the condensers. Evaporative cooling in the cooling tower cools the circulating water. A small portion of the circulating water would be injected into the geothermal reservoir via dedicated cooling tower blowdown wells adjacent to the power plant site. The cooling tower blowdown removes the dissolved solids from the water that are concentrated as the water is cycled or reused in the cooling tower.

4.5 Water Conservation and Water Supply

4.5.1 Estimate of Quantity of Make-Up Water

The cooling towers would circulate an average of approximately 195,000 gallons per minute (gpm) total of cooling water to the OEC Units. An average of approximately 2,600 gpm of circulating cooling water would be evaporated from both cooling towers, and both would also blowdown (discharge) an average of approximately 800 gpm. To maintain water balance, the cooling towers would require an average of approximately 3,400 gpm or 5,500 acre-feet per year (total) of cooling tower makeup water.

Binary power plants such as the one proposed are closed loop systems such that geothermal brine produced from the geothermal reservoir is injected in whole back into the geothermal reservoir. Therefore, only a brackish water supply is needed for the cooling system. This is different from a geothermal flash plant where the condensed geothermal steam is used for the cooling water. Flash plants are used on higher temperature geothermal resources than is the case with the East Brawley resource.

Sodium hypochlorite (bleach) would be used for bacterial control in the towers as well as other chemicals for pH control and corrosion inhibition.

4.5.2 Water Saved by Conservation Measures

The estimated amount of water required for the East Brawley power plant is about 5,500 acre-feet. This is 27% proportionally less than that initially requested for Ormat's nearby North Brawley power plant and a 9% further reduction from North Brawley's final design quantity. This is the result of plant design and water optimization changes that were also implemented for the East Brawley power plant, thus a decreased amount than originally stated in the East Brawley CUP application.

The East Brawley Project area occupies approximately 100 acres so the water required for this project equates to about 67 acre-feet/acre. By comparison, farmland consumes about 5.5 acre-feet/acre. However, the project would supply electricity to 50,000 people, or about the entire population of Brawley, and would generate revenue of \$6,500/acre-foot of water compared to \$164/ac-ft for alfalfa based on data from the Summit Blue Consulting, LLC *Renewable Energy Feasibility Study* prepared for Imperial County in 2008.

4.5.3 Water Supply from IID

Ormat plans to obtain its water for cooling tower make-up from the Imperial Irrigation District (IID). Therefore, water losses (via evaporation and blowdown) from the cooling tower would be made up by irrigation water obtained under contract from the IID. Although the Best Canal is closest to the power plant, IID has indicated it does not have the capacity to deliver the water from this canal due to changes in that canal south of the City of Brawley. Makeup water would be obtained from IID Gate 131 on the Rockwood Canal located about one-half mile east of the power plant site. The water from the Rockwood Canal would be gravity fed or pumped in a 10-24 inch pipeline that would be either underground or put within the Livesley Drain that runs east to west between the canal and the power plant (Figure 3).

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The project's water consumption would be met by the IID through their current resources, transfers from other sources or would be offset through water conservation projects identified and approved by IID. Water taken from IID would be subject to the approved Equitable Distribution program during years of water supply demand imbalances. The IID is currently developing an Integrated Water Resources Management Plan to address the water supplies for new non-agricultural projects. In the immediate term the IID has completed an *Interim Water Supply Policy for New Non-Agricultural Projects* (IID 2009) which was recently approved by the IID Board of Directors approval. The IID is expected to execute the pending contract agreement with Ormat for Project water supply upon approval of the interim policy.

4.5.4 Water Supply Alternative: From City of Brawley Wastewater Treatment Plant

As described above, Ormat plans to obtain its water for cooling tower make-up from IID. However, as an alternative and/or supplemental source of water supply, Ormat is currently working with the City of Brawley to obtain treated, or recycled, water from their wastewater treatment plant located immediately west of the power plant site (Figure 2). Ormat and the City of Brawley have entered into a Memorandum of Understanding to facilitate exclusive negotiations for the reclaimed wastewater which includes the construction of a tertiary system to the City's secondary system which is currently being upgraded by the City. The additional agreements include an operations and maintenance (O&M) agreement for operation of the tertiary facility. The City would ultimately own and operate the tertiary facility when it is completed.

This source of water would not be available until 2013 when the tertiary treatment plant would be expected to be completed. Therefore, in the interim period, water from the IID and/or other alternative sources (as described below) would still be needed for the project.

Under this alternative, the City would deliver reclaimed water to the East Brawley Project which is approximately ¼-mile east of the treatment plant adjacent to the New River where it currently discharges treated wastewater under an NPDES permit. The City currently generates approximately 4,400 acre-feet (3.9 mgd) of wastewater per year. As stated above, the estimate of the water requirement for the East Brawley Power Plant would be 5,500 acre-feet per year. Assuming that the effluent from the WWTP will average 4,400 acre-feet a year, ORNI 19, LLP would be capable of utilizing all (100 percent) of the recycled water for cooling water makeup. However, as noted below, an additional source of water would be required during the hot summer months.

As noted, the new tertiary treatment facility is currently scheduled to be operational in early 2013. Thus, water from the Imperial Irrigation District and the Colorado River

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This treatment plant utilizes a lagoon system to treat 3.9 mgd of domestic sewage (2008 average daily flow). The City of Brawley is currently upgrading the existing WWTP to increase its average daily flow capacity to 5.9 mgd, and to meet more stringent NPDES permit requirements for ammonia removal. Construction of the plant upgrade is expected to be in early 2010 and be completed by late 2012. Although the upgraded and expanded plant will produce a higher quality secondary effluent, this effluent will not be of the quality required to meet the California Title 22 criteria for direct use of recycled water in open recirculating cooling water systems. Additional tertiary treatment facilities will be required in order to meet these requirements, as well as water quality requirements specific to cooling water system operation.

Water Supply Objectives from Brawley WWTP

Ormat's objective is to meet 100 percent of the make-up water demand for the cooling towers at the proposed East Brawley power plant with reclaimed water. As noted above, engineering estimates are that for a 50 MW plant, the make-up requirement would be up to 5,500 acre-feet per year, which means that Ormat will use 100 percent of the recycled water from the WWTP and will need an additional water supply. Additional water sources are described in Section 4.5.5 below.

Tertiary Treatment Objectives

Tertiary treatment consisting of coagulation, filtration and disinfection will be required to meet or exceed the performance objectives of the California Recycled Water Criteria (Disinfected Tertiary Title 22 Recycled Water; California Code of Regulations (CCR), Title 22) for direct use in open recirculating cooling water systems. This level of treatment will produce effluent that is low in turbidity, BOD, and microorganisms. Title-22 disinfected tertiary recycled water means a filtered and subsequently disinfected wastewater that meets the following criteria from the CDPH Purple Book Update. The requirements for filtered wastewater are at 22 CCR 60301.320, and the disinfection requirements at 22 CCR 60301.230.

Tertiary Treatment Processes

Secondary treatment involves oxidation and clarification, which are already provided by existing plant. In order to provide tertiary treatment, three components are traditionally necessary according to 22 CCR. These processes include flocculation, filtration and disinfection. The tertiary system will be based on either the addition of flocculation tanks and filtration systems, or the use of membrane bioreactors, and upgrading the disinfection process in order to assure meeting the applicable requirements. As stated above, a conceptual plan for the project is currently underway but not yet finalized. Per an internal draft of the conceptual plan, possible treatment methods to be included in the tertiary treatment plant include the following:

- Pretreatment
 - May include some form of phosphate reduction/removal, including chemical precipitation with lime, alum, polyaluminum chloride, or ferric chloride – if phosphate reduction is not low enough from the City's upgraded secondary treatment system. Minimum phosphate levels are required to protect the cooling tower system from corrosion.

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- Solids Processing, which would include pumping coagulated, settled solids/sludge from the sedimentation basins into a 100,000 gallon concrete storage sump, and from there the solids would be pumped to solids processing. The options for solids processing include recycling tertiary solids to WWTP (pumping the solids to the WWTP's activated sludge thickeners, or centrifuges), pumping the solids to the WWTP lagoons, or dewatering the solids with new centrifuges.
- Filtration. The following three alternatives for filtration/removal of suspended organic and inorganic solids from water have been considered:
 - Multi-media (such as use of silica sand, crushed anthracite coal, and garnet or ilmenite, alone or in dual and triple combinations) filters (gravity filters and pressure filters)
 - Cloth disk media filters (use of a cloth membrane as the filter medium)
 - Immersed membrane filters (including use of micro-filtration (MF) and/or ultra-filtration (UF) membranes)
- Disinfection: The tertiary treated water must be disinfected in order to meet the Title 22 criteria for recycled water use within open recirculating cooling water systems. In addition, disinfection of water controls biological activities in the cooling water systems as part of the chemical treatment program. Disinfection options include the following:
 - Ultraviolet light (UV) disinfection (either by using the WWTP's new UV system or a new system)
 - Chlorination disinfection, using either by dissolving chlorine gas in water or by adding hypochlorite salts or solution, all of which lead to the formation of hypochlorous acid (HOCL).

Water Storage

The effluent from the tertiary treatment system will be directed to a storage unit before it is conveyed to the East Brawley plant. Three options are being considered:

- Conversion of the current Lagoon #4 at the WWTP to a storage pond. This pond can store about 5 million gallons of water (currently preferred option)
- Construction of a water storage tank, about 5 million gallons, to be located on the property of the Brawley WWTP
- Construction of a water storage tank, about 5 million gallons, to be located on Ormat's East Brawley power plant property, immediately adjacent to the WWTP

Conveyance/Pipeline

The City of Brawley WWTP is within ½ mile of the East Brawley Power Plant, making conveyance of water relatively simple. The water would be conveyed via a pipeline, approximately 2,000 feet in length from the WWTP to the East Brawley cooling towers. The pipe would be manufactured from HDPE, and would be about 20 inch diameter. It would be buried about three (3) feet below ground, except being deeper below the railroad bed. The pipeline route is shown on Figure 8. The only property other than the City's and Ormat's would be the railroad, of which Ormat would obtain permits to place the pipe under the railroad right of way.

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Need for Additional Water Supply During Summer Heat Conditions

After 2013 when the tertiary treatment system would be complete, Ormat's engineering calculations show that during summer heat conditions, the water from the WWTP may not be enough in itself for cooling tower make-up and additional water may be required from another source. It is estimated that on average the additional amount of water that will be required would be approximately 700 gpm (1.100 acre-ft/yr). The possible sources of additional water are described below.

1. Future Growth of Brawley. With estimated growth rates of the City of Brawley, there should be year-round adequate supply of water from the WWTP in about 10 years. After this, Ormat would not need any additional water source.
2. Water Supply from IID: In the even that Ormat relies entirely on WWTP recycled water, a smaller water contract with the IID will be considered for the secondary water source. This is the primary option until Ormat can obtain enough water from WWTP after further growth of Brawley. As described above, water will be obtained from IID Gate 131 on the Rockwood Canal and piped to the plant. If canal water is used, 1.100 acre-ft a year would be required to supplement the amount from the WWTP.
3. Use of Blowdown Water: Treatment of the cooling tower blowdown water (from both this plant and possibly North Brawley plant) is being investigated so that the water can be reused in the cooling tower instead of injected into the geothermal reservoir.
4. Water from Shallow Groundwater Wells: Using "ground water", as a back-up water source during peak periods. The groundwater would need to be treated, either with reverse osmosis membranes or with a nano-filtration membrane. This is a desirable water source as it is currently not used and unusable for most other applications (the total dissolved solids is too high for use in agriculture), and the only impact we can see brought up as an issue being subsidence, but mitigation measures will be incorporated into the project for this (as described below).

Description of Possible Groundwater System: As a backup water source during peak periods, it is estimated that there would be about two groundwater wells that will be drilled and used to supply this water, with each well will being about 400-700 feet in depth. The wells would be approximately 24 inches in diameter at the top and telescope with depth. Each well pad will be up to 5 x 6 feet (30 ft²). The total production capacity of the wells will be up to about 1,500 gpm if used only as a backup source. In order to pump the water from the wells, on each well a centrifugal vertical production pump will be installed. The water will be pumped through carbon steel pipes to a water desalination system for purification for use in the cooling tower. The system would be based on salt rejection membranes (nanofiltration and reverse osmosis). The water desalination system will be installed in a 40 foot shipping container adjacent to the cooling tower.

The system would be comprised of various components including a sand separator, chemical dosing system (anti-scalant and acid), a series of micron filters and membranes, two booster pumps, and a control system (PLC controlled). The desalination system is

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expected to have 40% to 60% recovery ratio (40%-60% of the feed will be purified and used as cooling water makeup). The water desalination system will have two streams coming out of it: Permeate and Concentrate. The permeate will be used for cooling tower makeup. Because this water will be so clean, it is expected that 5-10 cycles of concentration in the cooling tower will be achieved with this water source. The concentrate will be injected into the geothermal reservoir together with the cooling tower blowdown.

Mitigation Measure Incorporated into Project for Subsidence from Use of Groundwater:

The following measures are incorporated into the project to monitor and mitigate for subsidence:

- Adequate subsidence network benchmarks will be placed around the plant site and tied to the County first order network and will be surveyed annually to detect the occurrence of subsidence. This data will be promptly submitted to the Imperial County Department of Public Works (ICPWD). The benchmarks would be installed to conform to County standards. Surveying would be performed to National Geodetic Survey (NGS) standards. The North Brawley I project has received approval for the program for the North Brawley Geothermal Overlay Zone which also covers the East Brawley project area.
- Mitigation measures such as increased injection rates, deeper injection wells and/or curtailed production operations are initiated subject to Division approval if a recognizable subsidence bowl forms in the project vicinity, or if unusual aquifer or injection interval pressure changes are observed.

4.5.5 Potential Impacts from Water Usage

Impacts to Water Supply/Utilities/Water Service Systems: Development Design Engineering (DDE) of El Centro prepared a SB610 Water Supply Assessment (WSA) of the proposed project (DDE, 2009). This study was intended for use by the County of Imperial in its evaluation of water supplies for existing and future land uses. The evaluation examined water availability, expected demands of the project, and reasonably foreseeable planned future water demands to be served by IID. DDE worked extensively over 9 months in close consultation with IID to gather and confirm the accuracy of the data and information presented in the WSA. IID water staff provided significant input to the document and deemed it acceptable before it was submitted to County Planning. A summary of the report is provided below.

The Water Supply Assessment has determined that IID's water supply is sufficient to meet project needs. Water supplies for the Imperial Unit are anticipated to satisfy projected water demands for 20-years given IID's existing agricultural, municipal and industrial uses, water conservation and transfer requirements, rules and regulations, and operational policies. Particular operational policies are the draft Interim Water Supply Policy (IWSP), and the in-process Integrated Water Resources Management Plan (IWRMP).

The WSA stated that water supplies for the Imperial Unit are sufficient to satisfy water demands of IID's current agricultural, municipal and industrial uses, water conservation, and transfer requirements for the term of the QSA. Given IID's rules and regulations, operational policies,

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water supply for new uses in the Imperial Unit are anticipated to satisfy water demands for the 20-year projection of this WSA. In particular, the draft IWSP and the in process IWRMP provide that 25,000 acre-feet will be made available in the near-term and an expected 50,000 acre-feet in the long-term for new municipal, commercial and industrial uses.

The area that would be taken out of agricultural production as a result of the EBGDP is estimated to use 991 acre-feet per year as farmland which uses a consumption rate of 5.25 acre-feet per acre annually. Based on the history of water delivered to the same area by IID from 1998 to 2007, on average the project site has received 912 acre-feet per year. A change in land use from agricultural to industrial for the area that would be taken out of agricultural production as a result of the EBGDP results in an annual consumption of 5,500 acre-feet per year. This is an increase of 455.00 +/- and 503.07 +/- percent when compared to the annual water usage for the area that would be taken out of agricultural production as a result of the EBGDP based on a consumption rate of 5.25 acre-feet per acre per year, and the average of IID's 10-year annual delivery history for the same area respectively.

In addition to the WSA, it is important to point out that the IID has approved and allocated the use of 25,000 acre-feet per year for non-agricultural/industrial uses through its "Interim Water Supply Policy for Non-Agricultural Projects" (dated 9-29-09). The approved 25,000 afy for potential non-agricultural projects within the IID's water service area far exceeds the combined water needs of all of the non-agricultural projects currently proposed. As such, sufficient water resources should be available for each of the projects. Additionally, as described above, Ormat has received a signed MOU with the City of Brawley to construct facilities designed to supply water to this geothermal project.

Impacts to Biological Resources: Prior to the County's preparation of the Initial Study for the East Brawley project, Development Design Engineering (DDE) of El Centro, prepared a study of the impacts of the project to the IID drains and the Salton Sea. DDE's analysis of the impacts to the IID drains and the Salton Sea ecosystem concluded that the impacts would be less than significant. This is supported by the information we present below and by the simple inference that because DDE's evaluation clearly concluded that the proposed project would have a negligible or less-than-significant impact to the water supply to the Salton Sea, it can be inferred or implied that the impacts to biological resources as a result of this insignificant reduction in water would also be insignificant.

Potential Impact to IID Drains & Salton Sea: Development, Design & Engineering (DDE) prepared an evaluation of the impacts of the proposed project to IID Drains & Salton Sea, dated December 3, 2009. As summarized in this report, the proposed water use for the facility is 5,500 acre-feet / year. This is the approximate amount of water needed to irrigate 1,048 +/- acres of agricultural land in Imperial Valley based on the assumption that an average acre of agricultural land uses 5.25 acre-feet per year, which is the 2009 apportionment for water users that have eligible farmable cropland. After analyzing the impacts of the project to IID drains and the Salton Sea, DDE determined that any potential impacts are negligible, or less than significant, for the following reasons:

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- The agricultural equivalent of land that correlates with ORMAT'S proposed water use equates to approximately 0.23% of IID's irrigated acreage, an insignificant amount.
- Approximately 13% of the total irrigated acreage within the Imperial Unit is irrigated at least twice, which conveys additional water to IID drains and the Salton Sea. When compared to this additional drainage water, the proposed project's reduction to drainage water is insignificant.
- Assuming the total average irrigated acreage of the Imperial Unit uses 5.25 acre-feet per acre per year, ORMAT proposes to use approximately 0.2% of all water used for agriculture in the Imperial Unit, an insignificant amount.
- The proposed project's reduction in drainage water is approximately 0.12% of the total outflow of the Salton Sea through evaporation, an insignificant amount.
- The proposed project's loss of drainage water is approximately 0.2% of the amount of drainage water generated from Imperial Unit's total average irrigated area, an insignificant amount.

Cumulative Impacts from Use of Water: In response to the report described above, IID inquired about an assessment of cumulative impacts considering other industrial facilities whose water use (or potential water use) would reduce the inflow conveyed to IID drains and subsequently, the Salton Sea. Following is a cumulative impact analysis on inflow to IID Drains and the Salton Sea, prepared in concert between Ormat, DDE, and Barrett's Biological Services.

The geothermal projects for which water applications have been submitted to IID and/or where CUP applications have been submitted to Imperial County for new industrial projects total approximately 8700 ac-ft. These include:

- East Brawley at 5500 ac-ft.
- Approximately 800 ac-ft for CHAR's Hudson Ranch 1 project, and
- Approximately 2400 ac-ft for CalEnergy's Black Rock projects at 800 ac-ft each.

This total combined amount of water from these projects is approximately 1/3 of the 25,000 ac-ft allocated by IID for industrial use under the IWSP for non-agriculture projects. Using the same calculations as those previously done for East Brawley, 8700 ac-ft calculates to 2523 ac-ft less to the drains (8700 * 29% (% of water to tile/drains) which is less than 0.2% of the water evaporated from the Salton Sea. Thus, this cumulative loss of water to the drains and ultimately from proposed projects is also insignificant. Additionally, no one drain will be impacted more than another. As a side note, rather than an adverse cumulative impact, there is actually a positive cumulative impact from these projects, in that this water reduces the amount of salt going to the sea by 8,700 tons.

The approved 25,000 ac-ft for potential non-agriculture projects is allocated to IID drains and the Salton Sea.

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and that may have pupfish present). Also the assessment lacked proper location of facility: making it difficult to evaluate any other wildlife species issues, such as Yuma Clapper Rail." Following is information to respond to this comment, again, prepared in concert between Ormat, DDE, and Barrett's Biological Services.

There are no drains near the proposed East Brawley power plant site that drain directly to the Salton Sea. Biological surveys completed in the area for the East Brawley project found no pup fish or Yuma Clapper Rail habitat. The project site is only 32.75 acres which will equal $(32.75 \times 5.25 = 172 \text{ ac-ft} \times 29\%)$ 50 ac-ft of water less to the Livesley Drain which is adjacent to the property. The 5500 ac-ft needed for this project and the loss of 1595 ac-ft to the drains that results would not come from that specific area but generically from the entire IID system. Taking "away" 5500 acre-feet of water from agriculture, which is what is implied, would be spread across the IID's district, not in the project area. Thus, $5500 \text{ ac-ft} \times 29\% = 1595 \text{ ac-ft}$ less to drains across the county. If the same assumption is used for 8700 ac-ft, $(8700 \text{ ac-ft}/2,730,000)$, 0.32% less water goes to the drains from these proposed industrial projects. This is an insignificant cumulative loss which also would not affect vegetation and/or wildlife found in the drains and/or the Salton Sea.

Review of IID's draft Integrated Water Resources Management Plan (IWRMP aka IRP) and Interim Water Supply Policy (IWSP) for Non-Agricultural Projects. Ormat has reviewed the IWRMP, participated in IID meetings and submitted extensive comments. The document contains much incorrect data about existing geothermal projects in the valley in addition to cooling technologies that are not viable in this meteorological environmental. We have submitted similar comments to the California Energy Commission. The use of geothermal steam condensate for cooling water, which is source of water for flash plants, causes depletion of the geothermal resource, subsidence, and release of the noncondensable gases from the geothermal fluid and produces geothermal scales that may be hazardous. Whereas, the Ormat binary process which requires "raw" water eliminates these negative environmental impacts. This is viewed as that the Ormat binary process is a much cleaner and environmentally sound method over steam and flash type plants, and certainly an environmental improvement over coal and gas power plants.

Review and Compliance with the IID Water Conservation and Transfer Project Draft Habitat Conservation Plan (HCP): Ormat and its team of consultants reviewed these documents. As shown in the calculations above, the proposed amount of water is insignificant to biological resources and, thus, will not impact either individually or cumulatively the requirements of the IID Water Conservation and Transfer Project draft HCP. In addition, pending the City of Brawley's completion of upgrades to the treatment plant currently scheduled for 2012, tertiary treated water is planned to replace IID's pending water contract. Therefore, this is a temporary use of canal water from IID, about 2-5 years.

5.0 DESCRIPTION OF WELLFIELD, DRILLING, TESTING, PRODUCTION, INJECTION

5.1 Geothermal Wellfield (Revised)

The Brawley geothermal wellfield is laid out in a grid pattern over cultivated fields in the project area. The grid pattern is generally aligned along field roads located adjacent to existing irrigation channels or drains.

A description of the revised/updated well field was included in an amendment to the East Brawley CUP application submitted to the County in March 2009. This information is provided below. A copy of the latest wellfield map is provided in Figure 3.

The well field was revised in March 2009 to reflect addition land that has been leased and the results of the exploration well drilling to date. The total well count has also dropped from 60 to about 34. It will still be split about equal between production and injection wells. The New River pipeline crossing is also reflected on the revised map. The amount of pipeline in the well field will be reduced as a result of less wells and a consolidated well field. Several of the well pads on the south end of the field will be best accessed from Shank Road.

Ormat has obtained an easement from the Imperial Irrigation District (IID) for the transmission line routing along Ward Road to the west of the proposed plant location. They own parcel number 037-160-51-01, a 5.78 acre parcel between the railroad and the Veysey parcel.

Ormat was selected by the City of Brawley to negotiate exclusively for the water from their Waste Water Treatment Plant. Ormat proposes to build the upgrades needed to bring the facility to tertiary treatment and then give the facility to the City and pay for the water via an operations and maintenance agreement. The City will be the CEQA lead agency for this project. The treatment plant will generate enough water for the East Brawley power plant such that canal water from the IID will only need to be a backup once the facility is built. Ormat is requesting that the County and the City work together under a Memorandum of Understanding to prepare a single CEQA document that satisfies both the City and the County because the issues brought up in the EEC hearing would be the same – impacts to water and ecosystems of the IID drains and Salton Sea.

This realignment of the well field will have less impact than the project as originally proposed as it is smaller. Biological and cultural resource surveys will be performed to duplicate those already completed on the other areas of the project.

Access to the well pads and pipelines would be from Andre, Best, Baum (not a County road), Groshen, Kershaw, Rutherford, Ward, and Wills Roads. Additionally, farm roads and IID roads (with permission) may be used for access. Encroachment permits for ingress/egress and irrigation canal and drain crossings would be obtained from the Imperial County Public Works Department and IID as applicable. With the exception of two well sites (14-15 and 15-15), all of the proposed well sites are located east of the New River. Access to farmland would be

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coordinated with the landowners to minimize impacts to the farming operations. The well pads and pipelines would be along the edges of the fields. New access roads would be constructed or improved only as needed to safely accommodate traffic required for well pad construction, well drilling, and well and road maintenance. Road widths to well pads would typically be no less than ten feet wide.

5.2 Well Drilling

Geothermal well drilling would be conducted from constructed well pads approximately 316 feet by 356 feet (about 2 acres). A well pad sump/containment basin (nominally 75 feet x 260 feet x 7 feet deep) would be constructed on each well pad to contain drilling mud and rock cuttings from the drilling operations (Figure 6). A Stormwater Pollution Prevention Plan (SWPPP) has been prepared for the geothermal well field and is amended for the construction of each new well pad to prevent stormwater discharges from the well pads during site construction.

Standard geothermal well drilling equipment and well drilling operations would be implemented for the project. The wells would be drilled using a large rotary drilling rig whose diesel engines are permitted under the California Air Resources Board (CARB) Portable Engine Registration Program (PERP). The wells would be drilled with water-based mud to circulate the drill cuttings to the surface. During drilling, the top of the drill rig derrick would be as much as 175 feet above the ground surface, and the rig floor could be 20 to 30 feet above the ground surface. The typical drill rig and associated support equipment (rig floor and stands; draw works; derrick; drill pipe; trailers; mud, fuel and water tanks; diesel generators; air compressors; etc.) would be brought to the prepared site on approximately 40 or more large tractor-trailer trucks. The placement of this equipment within each prepared site would depend on rig-specific requirements and site-specific conditions.

The well bore would be drilled using non-toxic, temperature stable gel-based drilling mud or gel and polymer drilling fluid to circulate the rock cuttings to the surface where they are removed from the drilling mud. The mud is then recirculated. Rock cuttings would be captured in the containment basin. Additives would be added to the drilling mud as needed to prevent corrosion, increase mud weight, and prevent mud loss. The inside diameter of the wells would be approximately 30 inches at the top and would telescope with depth. The typical design depth of both the production and injection wells is projected to be about 4,500 feet. Each geothermal well would be drilled and cased to the design depth or the depth selected by the project geologist. The final determination of well depth and well completion would be based on geological and reservoir information obtained as wells are drilled.

The California Division of Oil, Gas and Geothermal Resources (CDOGGR) regulates geothermal well drilling operations on private lands in California. CDOGGR approves the drilling program for each well including the blow out prevention equipment (BOPE) to ensure the drilling operations are safe, protect the community, and protect land and water resources. Drilling operations would take place for 24 hours per day, 7 days per week. Each geothermal well would take approximately 30 days to complete.

5.3 Well Testing

Wells would be tested while the drill rig is still over the well. The residual drilling mud and cuttings would be flowed from the well bore and discharged into the drilling sump. This cleanout flow test may be followed by one or more short-term flow tests, each lasting from several hours to a day and also conducted while the drill rig is over the well. These tests typically consist of producing the geothermal well into portable steel tanks brought onto the well site while monitoring geothermal fluid temperatures, pressures, flow rates, chemistry and other parameters. Steam from the geothermal fluid would be allowed to discharge to the atmosphere. Produced fluid from the short-term flow test would be pumped back into the well.

An injectivity test could also be conducted by injecting the produced geothermal fluid from the steel tanks back into the well and the geothermal reservoir. The drill rig would likely be moved from the well site following completion of these short-term test(s). Following the short-term test, all equipment would be removed and the well shut in. Temperature profiles of the wellbore would be measured during the shut in period.

After the rig has moved, a longer-term test could be conducted using a test facility consisting of approximately ten, 21,000-gallon steel tanks, injection pumps, coil tubing, nitrogen pumps, filtration units, flow meters, recorders, and sampling apparatus. This test could last for 30 days. Steam from the geothermal fluid would typically be allowed to discharge to the atmosphere. The remaining water would be injected back into either the well from which it was produced or into a second well via temporary pipeline routed along the well site access roads.

Following completion of the short-term geothermal well testing, all of the drilling and testing equipment would be removed from the site. The surface facilities remaining on the site would typically consist of several valves on top of the surface casing, which would be chained and locked and surrounded by an approximately 12-foot by 12-foot by 6-foot high fence to prevent unauthorized access and vandalism.

5.4 Production and Injection Wells

Geothermal resources required to supply the power plant would be supplied from the production wells surrounding the power plant location. Geothermal fluid injection wells would be required to inject the geothermal fluid produced for the project back into the geothermal reservoir. The production and injection wells would be drilled from selected well sites. More than one injection well may be placed on an injection well pad to reduce the use of farmland for the project.

As geothermal production and injection wells age they typically produce less and/or cooler geothermal fluid, or inject less fluid, and may need to be redrilled or worked over. Redrilling or reworking a well requires many of the same activities required to drill a new well. These activities would occur periodically over the life of the project. Any of the geothermal production wells which do not demonstrate sufficient commercial productivity may be converted to an injection well. Any of the wells could also be converted to a monitoring well, or could be abandoned in conformance with the requirements of the CDOGGR.

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Dedicated cooling tower blowdown wells (2-4) would be drilled in the same way as an injection well. The only difference is the fluids they take for injection is the water from the cooling tower which is not geothermal brine. These wells would be located adjacent to the power plant.

5.5 Well Site Production and Injection Equipment

Each new production well would be equipped with a pump driven by an electric motor located on top of the well pump discharge head. A small, truck-mounted well maintenance rig would install these pumps in the wells. Other small trucks and vehicles would be involved in installing the pump, which is normally conducted only during daylight hours. An electric cable installed along the pipeline from the power plant would provide the electricity to power the well pump motor. Mineral oil is pumped down from the surface at the rate of one to three gallons per day to lubricate the downhole pump lineshaft bearings. This lineshaft bearing lubrication water or mineral oil would be discharged into the produced geothermal fluid and eventually injected into the geothermal fluid injection reservoir. The mineral oil is less than 2 ppm of the volume injected. Production wells would have corrosion and scale inhibitor located on the well pad with secondary containment.

Production wellhead dimensions are not expected to exceed a height of fifteen feet above the ground surface or four feet in diameter. An approximately 8-foot by 15-foot, 10-foot high motor control building may be located within approximately 50 feet of each production well. It would house and protect the auxiliary well systems, motor switchgear controls and sensors, and transmitters for temperature, pressure, and flow rate data. The wellhead, pump motor and motor control building would each be painted an earth tone color to blend with the area and minimize visibility. A gas separator would also be located on each well pad used for production wells. They are 6 feet in diameter, 20 feet long and stand 18 feet tall. Up to about twenty-five percent of the geothermal noncondensable gases separated at each of the well pads may be delivered through dedicated noncondensable gas pipelines to the geothermal noncondensable gas scrubbing system located at the power plant site as described previously.

Each well pad would also include a sand separator for removing sand from the geothermal fluid and a booster pump to increase geothermal fluid pressure. Neither wellhead pumps nor the auxiliary equipment or motor control buildings are required at the injection well sites. Instead, injection pumps located at the power plant site would pump the geothermal injection fluid through the injection pipeline system, providing sufficient pressure to inject the cooled geothermal fluid back into the geothermal reservoir. More than one injection well may be located on an injection wellpad. It is likely that some sort of sand separator and/or filtration system will be located at the injection well pads (in addition to production well pads).

5.6 Geothermal Pipeline Systems

Above ground pipelines will be constructed to deliver the produced hot geothermal fluid from the production wells to the power plant site (aka geothermal production fluid pipelines). Similarly, above ground pipelines will be constructed to return the cooled or spent geothermal fluid from the power plant site to injection wells for subsurface injection of the fluid back into the geothermal reservoir (aka geothermal injection fluid pipelines). The proposed interconnecting production and injection fluid pipeline routes are shown on Figure 3.

East Brawley Geothermal Development Project Updated Project Description

Each of the production wells would deliver geothermal fluid to the power plant through new pipelines routed in corridors adjacent to existing farm roads or parallel to, but outside of the rights-of-way of County roads. The total length of new pipeline would depend on which of the production wells were connected to the power plant. Ormat either has geothermal leases with the landowners where the pipelines would be located or would work with the landowners to obtain easements for the placement of the pipelines to minimize impact to farming operations and to stay outside of Imperial County rights-of-way, not only existing but for future expansion.

Similarly, the injection fluid pipelines to the injection wells would be routed in corridors adjacent to existing farm roads or parallel to, but outside of the rights-of-way of County roads. In some sections, the injection pipeline would also parallel the new production pipeline. Here the injection pipeline would either be placed adjacent to, or atop ("piggyback") the production pipeline. The total length of new injection pipeline would also depend on which of the injection wells were connected to the power plants.

The total length of new pipeline would depend on which of the wells were connected to the power plant. If all of the approximately 35 wells were connected, then approximately 9 miles of new production fluid pipeline would be constructed.

The production and injection pipelines would be constructed from steel pipe designed, constructed, tested and inspected pursuant to current industry standards for high temperature, high pressure piping. The diameter of the steel pipe would vary depending on the type and amount of geothermal fluid to be conveyed. Once covered with about two inches of insulation (one inch for injection pipelines) and a protective metal sheet (appropriately colored to blend with the area), the overall outside diameter of the finished pipe would range from 8 to 36 inches. The pipelines would be constructed near ground level (averaging about one foot off the ground) on pipeline supports installed approximately every 20 to 40 feet along the pipeline routes.

"Expansion loops" would be constructed about every 250 to 500 feet along the production pipeline route so that the pipeline could "flex" as it lengthens and shortens due to heating and cooling. These square bends in the pipeline are typically horizontal, approximately 40 feet in length by 40 feet in width. Some expansion loops are vertical, although these are typically smaller, 15 to 20 feet high. Electrical power and control cables for the production well pump motors and valves, and production and injection wellhead instrumentation would be installed in steel conduit constructed on the pipe supports, buried in a trench dug next to the pipelines or provided by an aboveground electrical distribution line. Injection pipelines have fewer expansion loops.

Some new access roads would be built for pipeline construction or maintenance. Pipeline construction would not require significant grading of the pipeline route. The pipeline would be constructed to cross beneath existing roads to allow continued access. Pipeline crossings of any unpaved roads (including Ward) would typically be constructed by the cut-and-fill method, which minimizes the time during which traffic on the road would be impacted. A trench would be cut through the road and a prefabricated U-shaped section of insulated, wrapped geothermal

East Brawley Geothermal Development Project Updated Project Description

fluid pipe, placed inside a larger diameter pipe or otherwise protected so that it is strong enough to support traffic on the road above, would be placed in the trench. The excavated dirt would then be backfilled and compacted around and above the pipeline or pipe sleeve, and the roadbed material would be repaired or replaced. Access would typically be restricted for only a few hours during actual construction. Appropriate traffic controls (including detour signs) would be in place during any construction within the roadbed or adjacent shoulders of each road to warn and control traffic.

For the crossing of Best Road, the pipeline and accompanying power and control cables would be installed by cut and fill technique or with microtunneling procedures. The latter technique does not disrupt traffic and neither technique would cause settlement of the roadbed. Microtunneling would be conducted by specialty contractors using specialized equipment. Oversize steel casing would be installed behind a boring machine that would be advanced under the road by "jacking." Pits would first be excavated and braced at each end of the casing run. The boring machine and casing sections would then be lowered into one pit. The boring machine (with casing behind it) would be "jacked" under the road using specially designed jacks. Casing sections would be welded together as they are moved forward to form a continuous casing under the road. Once the welded casing is in place under the entire road the boring machine would be removed through the other pit. Cement grout under pressure would be used to fill any voids between the casing and the dirt under the road.

The pipeline crossing of the New River would interconnect facilities on the east and west sides of the river. The crossing is discussed in further detail in Section 5.7 below.

Pipeline crossings of the Imperial Irrigation District (IID) canals or drains would be above ground or underground at their request. All River and IID canal and drain crossings would be engineered and constructed in conformance with the applicable IID encroachment permit requirements. Field drains and head ditches would be crossed by the pipelines as agreed to with the individual landowner/geothermal lessor.

Pipeline construction would be conducted concurrent with the construction of the power plant.

5.7 New River Pipeline Crossing

A description of this project was included in an amendment to the East Brawley CUP application submitted to the County in March 2009. This information is provided below. See the March 2009 submittal for draft figures and drawings; however, the plans have been revised/refined somewhat and the latest preliminary draft plans are available from Ormat.

This project involves the installation of piping over the New River north of the City of Brawley, east of Highway 111 and Andre Road and just south of the City of Brawley's Wastewater Treatment Plant (See attached figure). It will be located on private land (APN 037-140-02-01) owned by Veysey, Victor V. & Janet D and under lease to ORNI 17, LLC in the southeast corner of Tract 118 (see map). Several pipes from geothermal pads on the east side of New River will be extended across the New River (WGS 84 33°1'01.4"/115°31'12.1"). The pipes will allow connection of geothermal wells located on both sides of the river. The pipe crossing at the river

East Brawley Geothermal Development Project Updated Project Description

will be approximately 18 feet wide and begins at the end of a private road on each side of the river.

The crossing will support the following equipment:

- 2 x 24 inch geothermal brine lines
- 2 x 12 inch noncondensable gas lines (mostly carbon dioxide)
- 1 x 16 inch pipe for canal water for cooling tower make up
- 1 x 12 inch pipe for cooling tower blow down water (possibly from North Brawley to East Brawley)
- A 36 inch cable tray for power and control cables
- A man walkway for maintenance and inspection

The crossing would be a truss structure spanning the river. The footings to support the structure and pipes will be approximately 15-20 foot square on each side of New River. A total of two footings will be placed approximately 10 feet east and west of the bank of New River. The footings are located in an area of sparse vegetation consisting of salt cedar (*Tamarix sp.*). The area necessary for construction activities will be approximately 100 feet and will be located east and west of the bank of New River.

The pipes will be constructed of industrial standard designation of "extra heavy" wall thickness. An automatic injection pump shut-off and check-valve system will immediately stop fluid flow should a leak or break occur in any of the pipes. A system of pressure and flow sensing devices, capable of detecting any leak or spill, would be installed and maintained. Additionally, the pipelines would be inspected on a regular basis. The crossing and pipelines will be designed, engineered, manufactured and assembled to perform and comply with all the relevant county, state and federal regulations such as California Building Code, ASME and OSHA.

The pipe will be positioned through the use of cranes located east and west of the bank of New River. Other construction equipment will include a forklift, water truck, backhoe and loader. The area on each side of the river where the crossing will be anchored is flat and will require minimal grading. No grading permit is anticipated to be required based on the amount of dirt to be moved. The anchors will be away from the river bed. Erosion control measures will be implemented if the final design indicates that protection of the river is needed from potential erosion or run-off during construction. Construction time will be brief: approximately five to six weeks.

Locked gates will be located over the pipelines on each end of the crossing to prevent public access. There will be a walk way area to allow workers to inspect the pipelines, there is no vehicle access. The gates will signed "private property" and "no trespassing" in both English and Spanish.

Potential impacts to biological resources, cultural resources, and other issues were discussed in the March 2009 submittal with a conclusion of no significant impact from the New River Bridge Crossing.

6.0 TRANSMISSION AND INTERCONNECT

ORNI 19, LLC is negotiating a power purchase agreement (PPA) for sale of the energy generated by the project with Southern California Edison (SCE). If these negotiations falter, the project would not stop as ORNI 19 LLC could either contract with other utilities or energy companies or could use an option under the existing North Brawley Geothermal Project PPA with SCE which allows them to sell up to 100 MWs.

A substation would be located on the west side of the power plant site. A new transmission line would interconnect to the IID at the North Brawley 1 substation located near the intersection of Hovley and Andre Roads. The interconnection line would be a 2- to 5-mile long double circuit 13.8- and 92-kilovolt (kV) transmission line with 66-foot high poles. The transmission line pole and turning structure designs have not yet been completed, but the distance between the conductors and the ground wire near the top of poles will exceed 60 inches to prevent the potential electrocution birds that may perch on the poles. Both the new substation and the interconnection transmission line would be part of the East Brawley Project. The new line would span the New River, but no structures would be constructed within the River. Encroachment permits and easements would be obtained from the landowner or agencies as required for permitting and installation of the interconnection transmission line.

The proposed interconnection transmission line route and one alternative route are under consideration as shown in Figure 7. The proposed interconnection line would be routed to the west from the power plant substation, crossing the New River and would be aligned north of Andre Road to the interconnection point at the North Brawley 1 substation (west route). The alternative interconnection transmission line route would course northerly to an alignment on the south side of Baum/West Baughman Road turning west and crossing the New River to Hovley Road where it would turn to the south to the North Brawley 1 substation interconnection point (north route). The substation and interconnection transmission line construction would be conducted concurrent with the construction of the power plant.

The substation at North Brawley is the point of demarcation between Ormat and the IID. The substation is owned by ORNI 18, LLC. The transmission lines beyond the substation are owned and operated by IID to a point of interconnection with California Independent System Operator's (CAISO) controlled grid.

7.0 ABANDONMENT AND SITE RESTORATION

The projected life of the Project is a nominal 30 years. At the end of the useful life of the Project, equipment and facilities would be properly abandoned. The geothermal wells would be abandoned in conformance with the well abandonment requirements of the CDOGGR. Abandonment of a geothermal well involves plugging the well bore with clean drilling mud and cement sufficient to ensure that fluids would not move across into different aquifers. The wellhead (and any other equipment) would be removed, the casing cut off at least six feet below ground surface, and the well site reclaimed.

East Brawley Geothermal Development Project
Updated Project Description

At the end of power plant operations, the project would prepare and implement a Site Abandonment Plan in conformance with Imperial County and CDOGGR requirements. The Plan would describe the proposed equipment dismantling and site restoration program in conformance with the wishes of the respective landowners/lessors and requirements in effect at the time of abandonment. Typically, above-ground equipment would be dismantled and removed from the site. Some below ground facilities may be abandoned in place. The surface of the site would then be restored to conform to approximate pre-project land uses.

8.0 ALTERNATIVES CONSIDERED BUT ELIMINATED

An alternative project location for the project was considered, but it was determined that the proposed project was specific to Ormat's geothermal leases in East Brawley. A geothermal project must be sited near the commercial geothermal resource it is utilizing because the geothermal resource cannot be transported long distances without losing its heat and viability as an exploitable energy source. Ormat acquired the proposed power plant location because of its location with respect to the geothermal resource and the availability for purchase. As such, an alternative project location was eliminated from further consideration.

9.0 ENVIRONMENTAL PROTECTION MEASURES

Measures intended to mitigate potential impacts from occurring as a result of the Project construction and operations were listed in the CUP application and applicant's provided Environmental Assessment.

10.0 LIST OF OTHER STUDIES PERFORMED FOR PROJECT

Barrett's Biological Surveys. 2008. *Ormat East Brawley Plant, Preconstruction Survey, Imperial County*. (May 2008). Prepared for Ormat Nevada, Inc.

Barrett's Biological Surveys. 2007. *Biological Technical Report, Ormat Geothermal Plant Site, North Brawley, California*. (May 15, 2007). Prepared for Ormat Nevada, Inc.

Darnell & Associates, 2009. *Traffic Study for East Brawley Geothermal Development Project*. December 1, 2009 (revised)

Development Design & Engineering. 2009. *East Brawley Geothermal Development Project, SB 610 – Water Supply Assessment – FINAL*. (August 11, 2009). Prepared for Ormat Nevada Inc.

Development, Design & Engineering, 2009. *Environmental Assessment of ORMAT's East Brawley Geothermal Development Project's Potential Impact to IID Drains & Salton Sea*. December 3, 2009

Environmental Management Associates, 2008. *Application for Authority to Construct ORNI 19, LLC – Ormat Nevada, Inc., East Brawley Geothermal Development Project*. October.

East Brawley Geothermal Development Project
Updated Project Description

Tierra Environmental Services. 2008. *A Cultural Resources Survey of 189-Acres Proposed for Geothermal Development near Brawley, Riverside [sic] County, California*. (November 2008).

Tierra Environmental Services. 2009. Letter Report: *Additional Cultural Resources Survey for the East Brawley Geothermal Project*. (March 17, 2009).

FIGURES

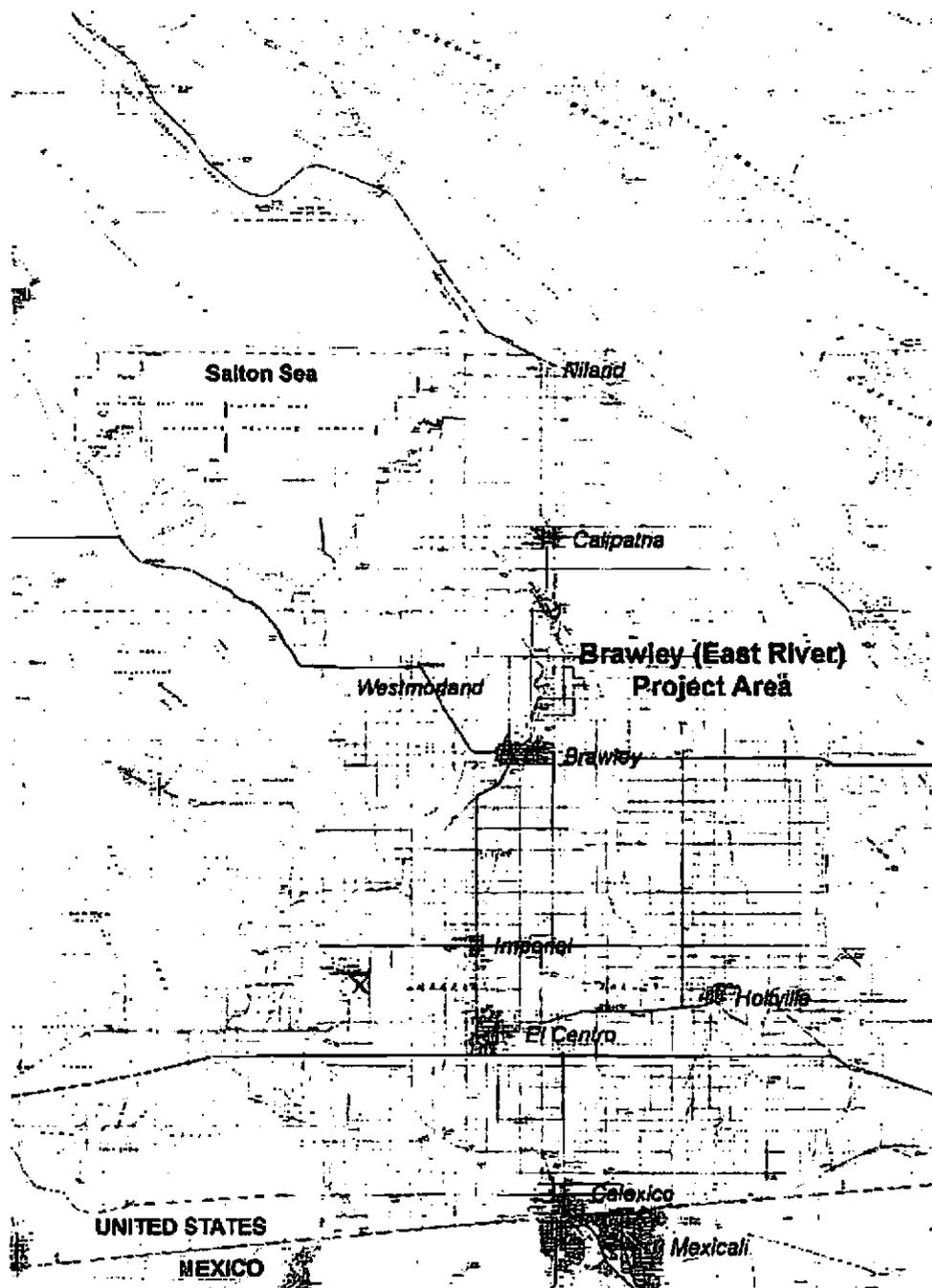


Figure 1: Location Map – Brawley East River Geothermal Development Project

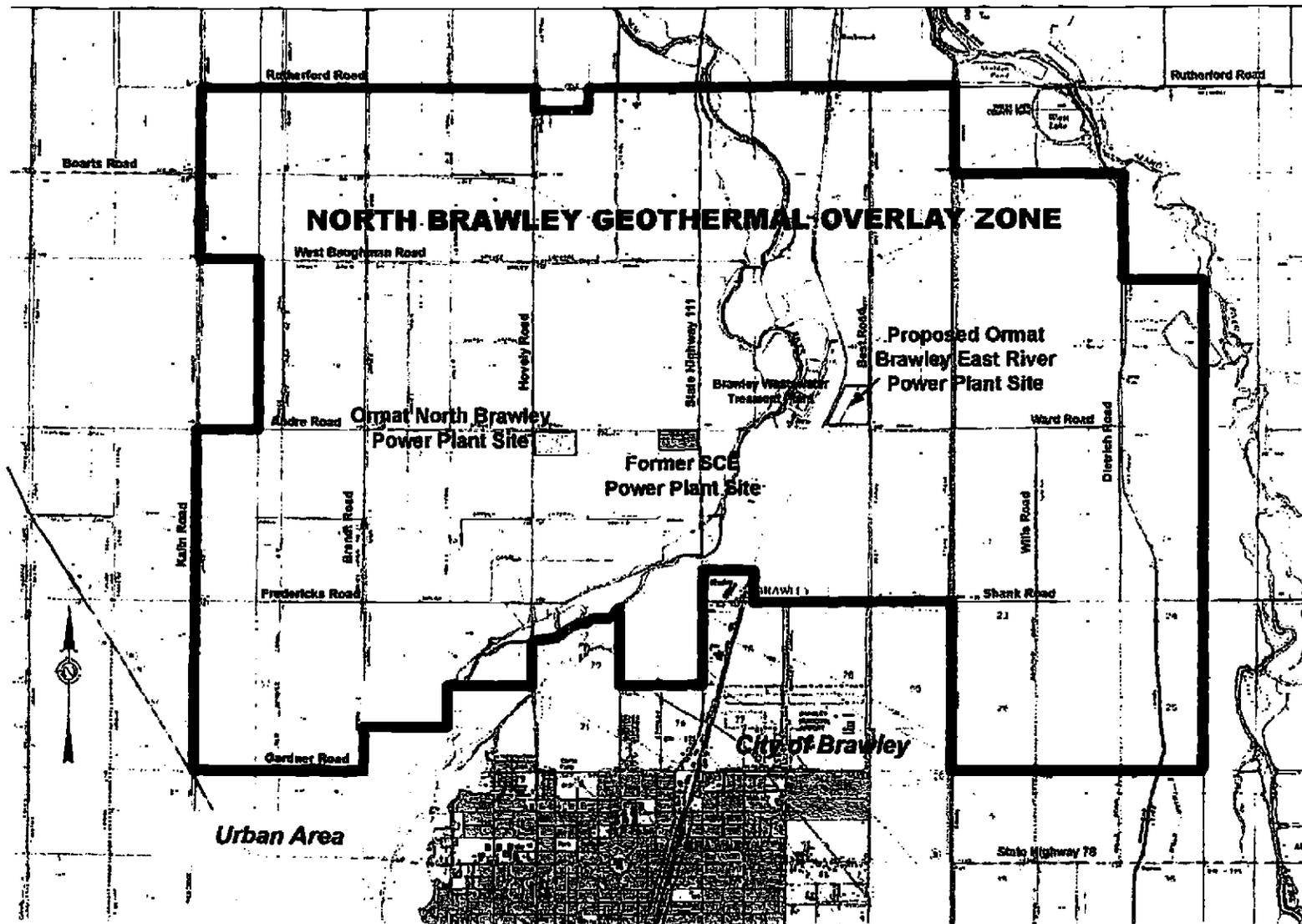


Figure 2: North Brawley Geothermal Overlay Zone Map Geothermal Wellfield – Brawley East River Development Project



- Proposed Geothermal Development Well Site: ●
- Approved Geothermal Exploration Well Site: ⊙
- Proposed Geothermal Pipeline Route: —
- Proposed Freshwater Pipeline Route: —
- Proposed New River Crossing: |

Project Area Extents
Shown on the Figure:



TN * MN
12°

0 0.5 1.0
Miles

Figure 3: Geothermal Wellfield – East Brawley Development Project

ORMAT Water Cooled Binary Geothermal Power Plant

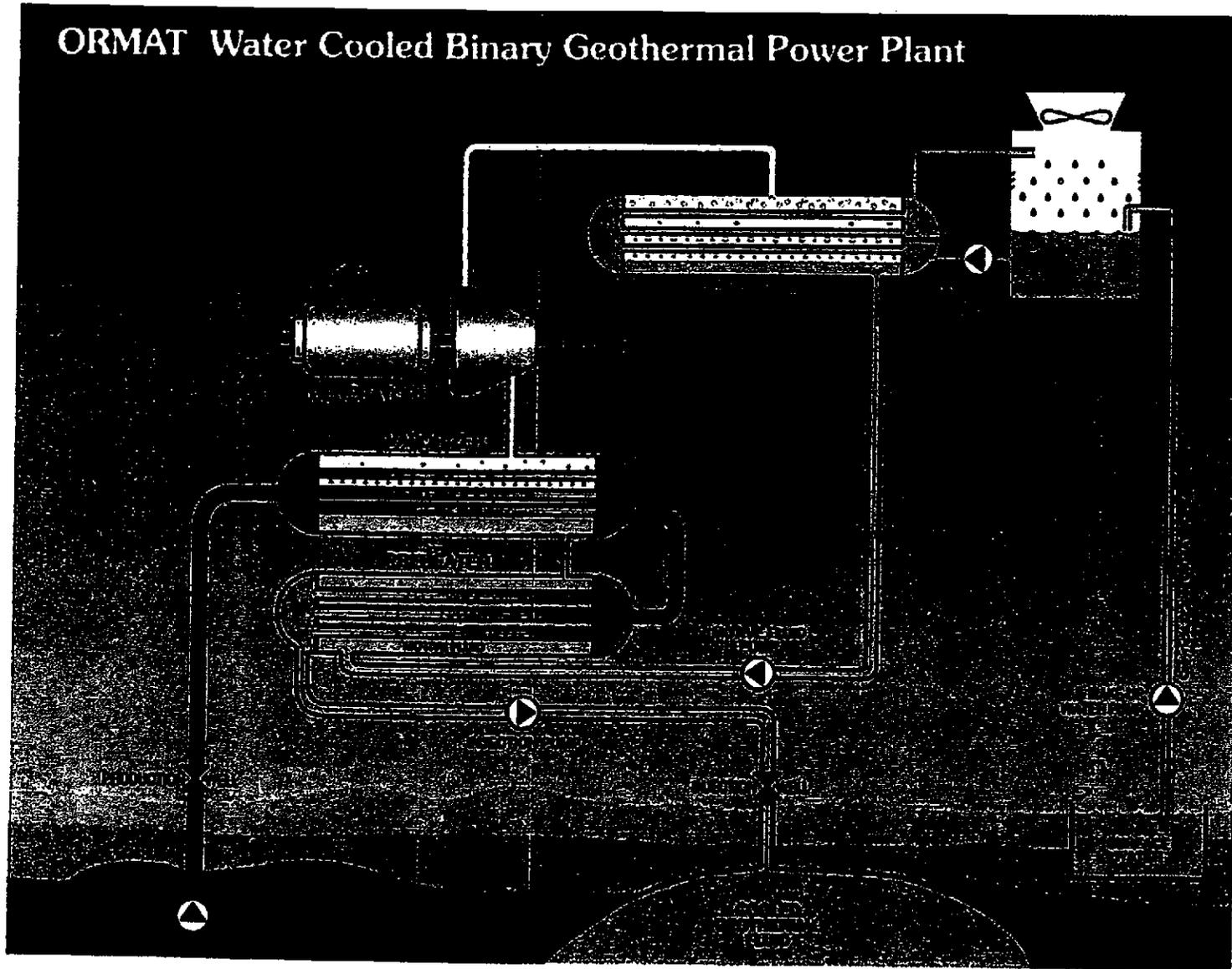
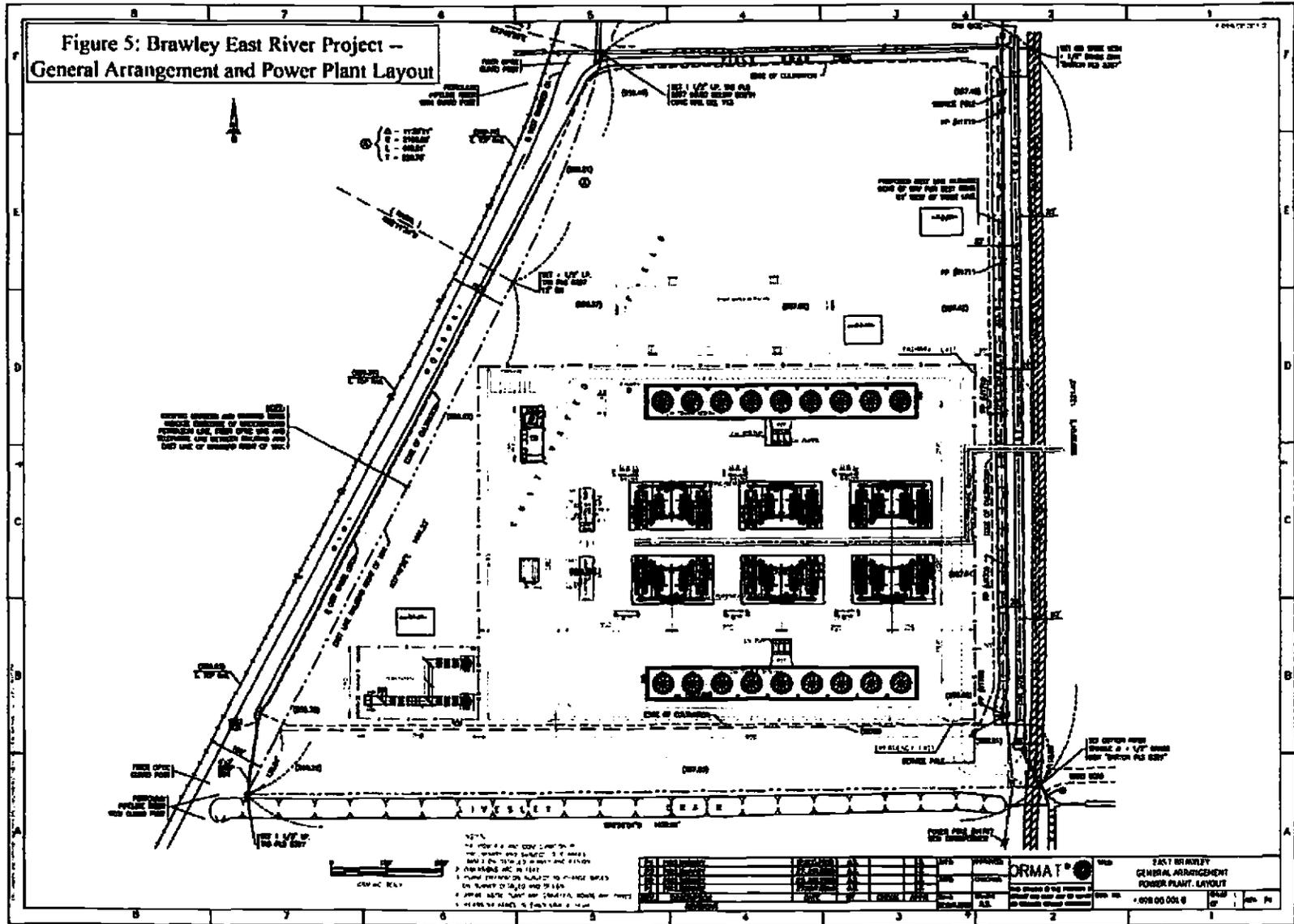


Figure 4: Schematic of Ormat Water Cooled Binary Geothermal Power Plant

**Figure 5: Brawley East River Project --
General Arrangement and Power Plant Layout**



TYPICAL WELL PAD LAYOUT DIAGRAM
BRAWLEY (EAST RIVER) GEOTHERMAL PROJECT

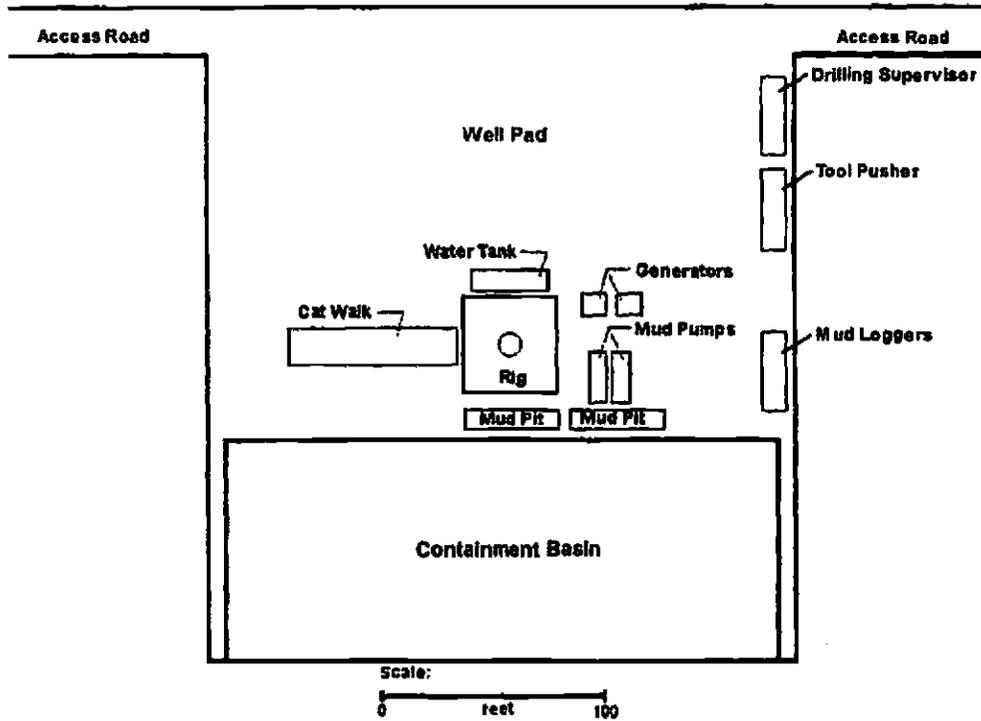


Figure 6: Typical Well Pad Layout Diagram

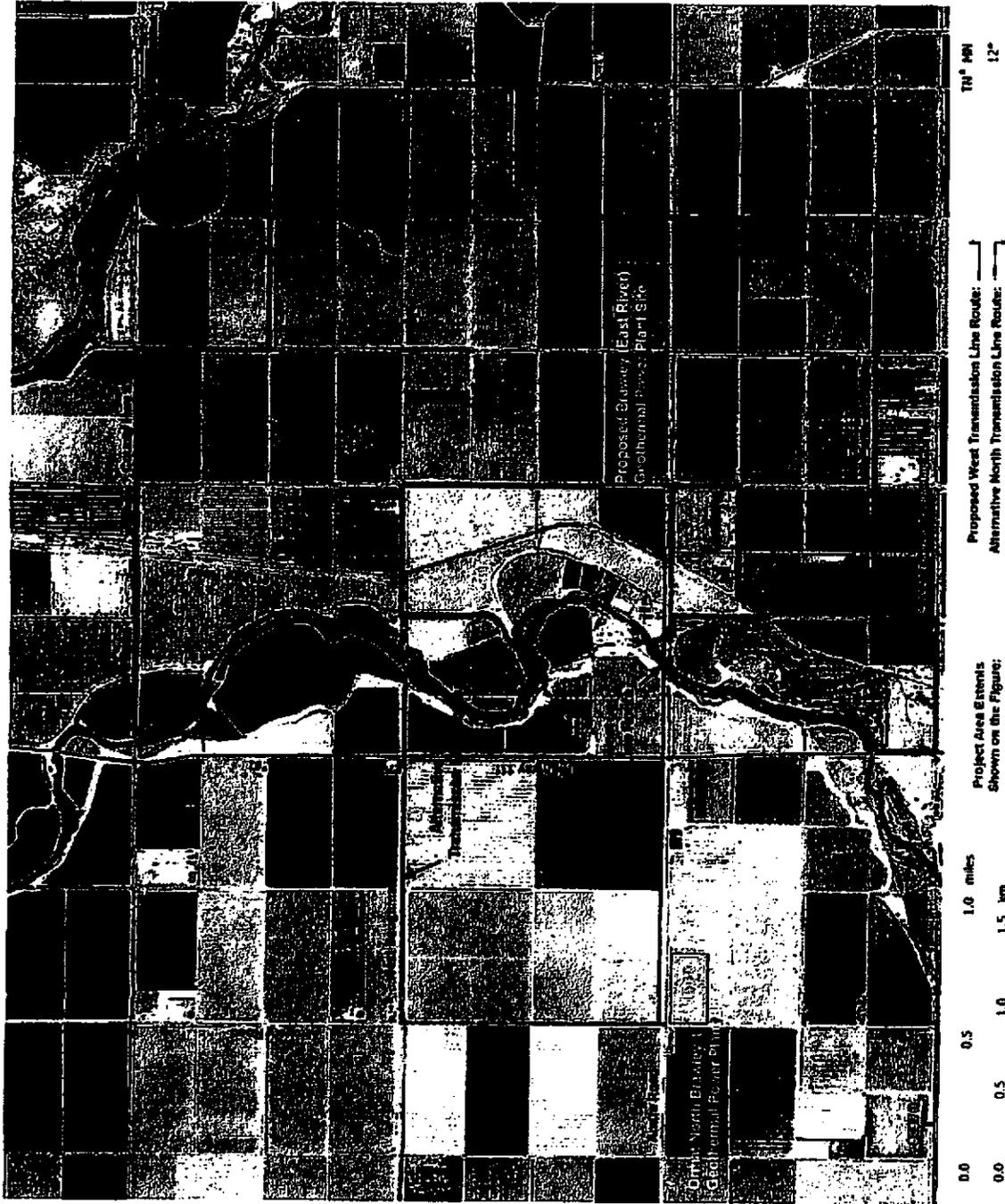


Figure 7: Proposed and Alternative Transmission Line Routes

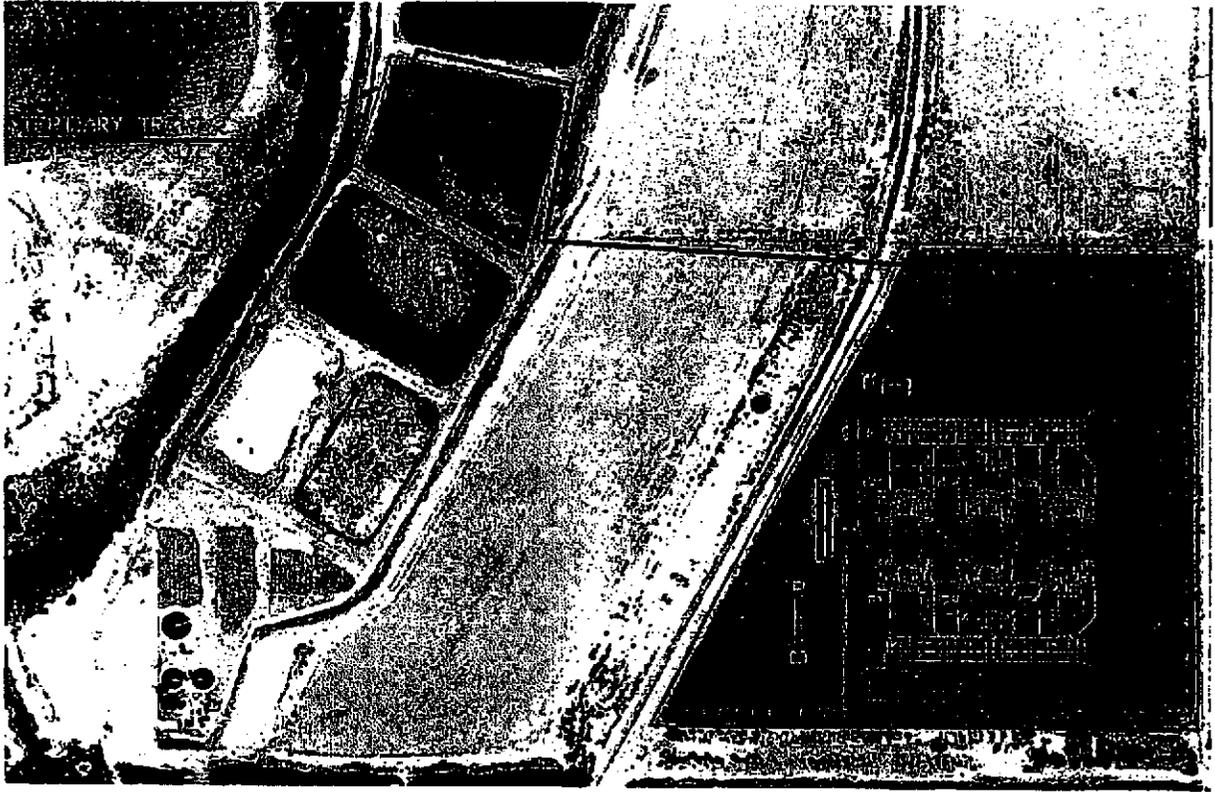
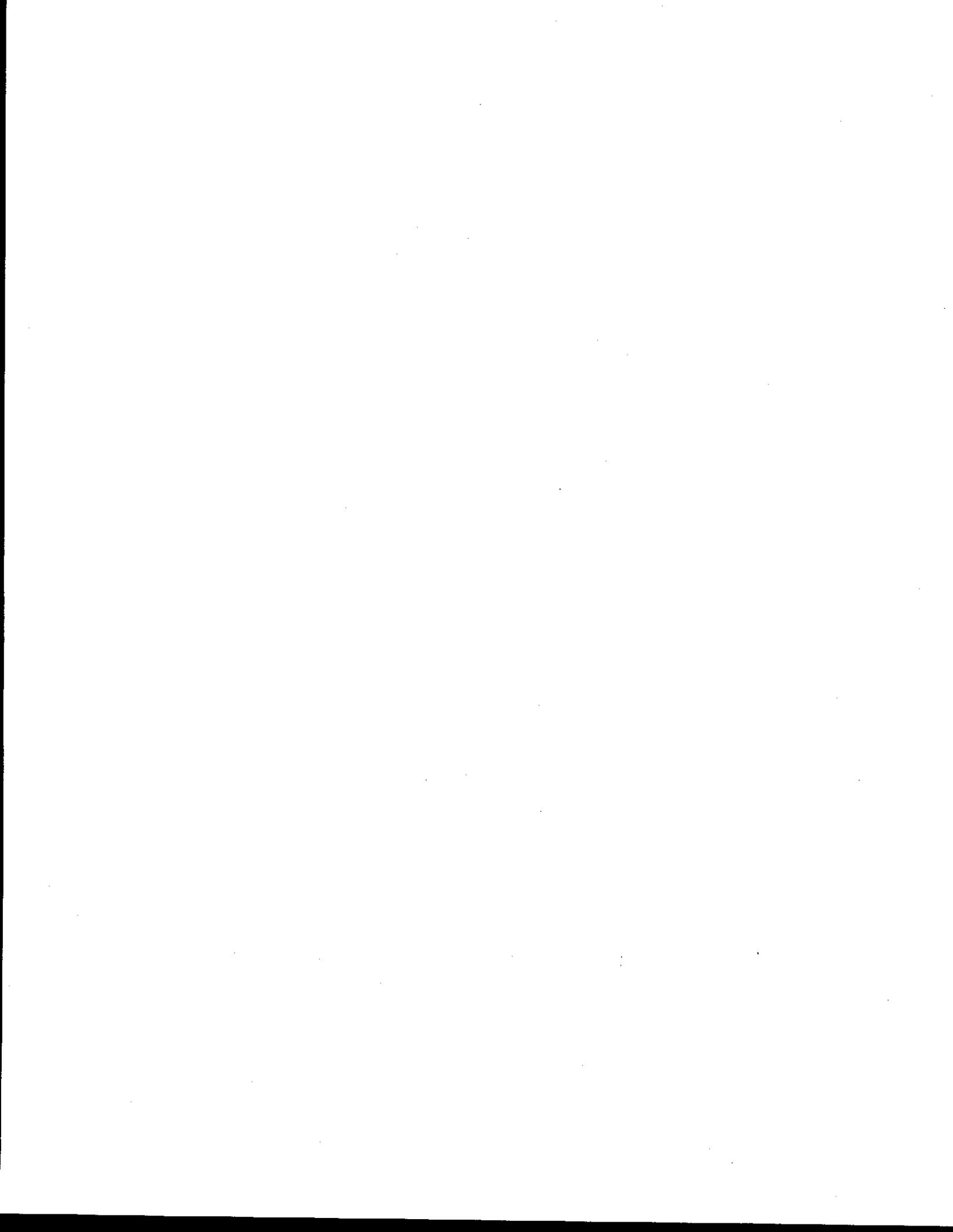


Figure 8: Proposed Tertiary Water Pipeline Route

Attachment K





BRAWLEY WASTEWATER TREATMENT PLANT TERTIARY TREATMENT FACILITY CONCEPTUAL DESIGN REPORT

1 INTRODUCTION

Ormat Nevada, Inc. (Ormat) currently utilizes canal water from the Imperial Irrigation District to provide make-up water to the cooling towers of the existing geothermal power generation facilities. Ormat is interested in reducing its use of canal water, and has commissioned this report to evaluate the use of effluent from the City of Brawley Wastewater Treatment Plant (WWTP) for use in the cooling tower make-up water at the East Brawley and North Brawley facilities. A tertiary treatment facility will be required to meet the performance objectives of the California Recycled Water Criteria (Disinfected Tertiary Title 22 Recycled Water) for direct use in open recirculating cooling water systems as well as water quality requirements specific to cooling water system operation.

The City of Brawley is currently upgrading the Waste Water Treatment Plant (WWTP) secondary system by replacing the existing lagoons with an extended aeration pond system employing wave oxidation technology that will provide full nitrification and denitrification. The plant upgrade includes new secondary clarifiers, aeration blowers, sludge dewatering and drying, new yard piping, electrical distribution and control systems.

Following is the conceptual design of the tertiary treatment system as developed and proposed by Ormat.

This design is the basis being used for design reviews by consultants and contractors in order to develop a final design. This conceptual design is intended to provide sufficient information for understanding environmental impacts and general parameters of final design with potential to change based on design reviews.

2 PROJECT VICINITY AND LOCATION MAPS

The tertiary treatment facility will be located on the City of Brawley WWTP. The City of Brawley WWTP is located at 1550 Best Road in the City of Brawley as shown Figure #1 – Vicinity and Location Maps.

3 PROJECT DESCRIPTION

The proposed tertiary treatment system will have a capacity of 5.9 mgd. As of 2008, existing Brawley WWTP average dry weather flows were 3.9 mgd. Therefore, the tertiary treatment system will operate at the initial available flow rate of 3.9 mgd but increase over time to 5.9 mgd as dry weather flow increases.

The new tertiary treatment system will receive water from the Secondary Effluent Diversion Structure which is being installed together new secondary system. The Secondary effluent flow will be diverted from the 42-inch pipeline to the Tertiary Influent Pump Station wet well. From the wet well, water would be pumped into a flash mixing chamber for alum addition. Alum or Ferric Chloride will be added using a high-energy direct-vacuum induction or pump diffusion system for near instantaneous and homogenous mixing.

Following flash mixing, the water will overflow into two (2) parallel flocculation and sedimentation trains. Flocculation will be based on a two-stage design. The first stage will provide greater mixing energy to begin particle agglomeration and floc formation. The second stage will impart less energy to avoid shearing and encourage continued growth of large settleable floc. After the flocculation chambers, water will flow into the rectangular sedimentation tanks. The majority of the suspended solids will be removed in the sedimentation basin and the supernatant will be collected via weirs from the top of the sedimentation basin. The supernatant would then flow into the multi-media filter by gravity. A polymer will be added to the water as needed to increase filter performance and minimize filtered effluent turbidity. The gravity multi-media filter would have four filtration cells operating in parallel with sand and anthracite media. The filtered water would be collected in the Filter Effluent Distribution Box.

The Filter Effluent Distribution Box will be designed with a two-way weir system that will allow the filtered water to flow into the Filter Backwash Supply Storage Sump, or to the Chlorine Contact Basin. Sodium hypochlorite will be injected at the dosage of 5 mg/L and the chlorine contact tank will provide two hours of detention time at 5.9 MGD to achieve the minimum 90 minute modal contact time required by Title 22. Once the water is disinfected by the Chlorine Contact Basin, the water would gravity flow into a storage equalization pond. The equalization pond would hold approximately 6.0 million gallons to provide an operational buffer in case of WWTP or tertiary system interruptions, or Power Plant operational disruptions. An Effluent Pump Station Wet Well would receive the water from the equalization pond and supply the water to Ormat's Power Plant. If required, it would be possible to inject Sodium hypochlorite at a dosage of 2 mg/L into the effluent pump station discharge pipe in order to maintain a residual disinfectant. The free chlorine residual will be monitored and analyzed downstream of the injection point. A flow schematic for the normal operations in dry weather conditions is presented in Figure #2 – Process Flow Schematic.

If the tertiary system operations are disrupted for a brief amount of time, the secondary effluent would be diverted to the existing UV disinfection system and flow into the New River instead of the tertiary treatment process. In this short period the water demand at the East Brawley Plant would be met by utilizing the equalization storage. Any secondary effluent excess flow above 5.9 MGD would also flow to the New River through the existing UV disinfection system.

A flow schematic showing the described temporary wet weather operations is presented in Figure #3 – Wet Weather Flow.

As part of the normal dry weather tertiary operation, the Filter Effluent Distribution Box will allow the filtered effluent to flow into the Filter Backwash Supply Storage Sump. The weir height will be equivalent to the weir height that controls flow to the Chlorine Contact Basin. This would keep the Filter Backwash Supply Storage Sump full at all times. The sump would have the capacity to store water to satisfy two sequential filter backwash cycles without interrupting normal tertiary treatment system operation. The Filter Backwash Supply Pumps would convey the stored backwash supply water to the media filter at a higher rate to provide cleaning, fluidization and restratification of the media. The backwash wastewater would then be collected and conveyed back to the Influent Pump Station Wet Well.

Alum/Ferric sludge will be collected from the sedimentation basin using a chain and flight system and conveyed to a sludge holding tank. The sludge pumps will convey the collected sludge to a new centrifuge system. One new centrifuge will be installed near the existing centrifuge. A new polymer system would be utilized at the new centrifuge system to increase the dewatering efficiency. The filtrate from the centrifuge would then be recirculated to the Tertiary Influent Pump Station wet well and the solids from the centrifuge would be collected and transferred to solids drying beds for further dewatering. Once the water content of the dried solids is reduced below 50%, the solids will be hauled off to a landfill for final disposal.

Chemical storage, feed systems, and electrical distribution and control system will occupy separate areas in a common building. The chemical area will house the following chemical feed and storage systems:

- Alum
- Caustic
- Sulfuric Acid
- Sodium Hypochlorite
- Polymer (Flocculation)
- Polymer (Dewatering)
- Sodium Bisulfite

4 EFFLUENT WATER QUALITY REQUIREMENTS

The total permitted design capacity of the WWTP will be 5.9 mgd. Ormat desires to use tertiary effluent from the Brawley WWTP for the use in evaporative cooling towers. Therefore, the tertiary treatment water must meet the requirements of Title-22 disinfected tertiary recycled water. The cooling tower make-up water requirements and water quality objectives for the East Brawley Power Plant are presented in the following Tables.

Tertiary Effluent Water Quality Objective

pH	pH Unit	< 7.9	6.0 – 8.0
TDS	mg/L	< 1,200	< 1,700
Total Alkalinity	mg/L as CaCO ₃	<300	< 300
Chloride	mg/L as Cl	450	450
Sulfate	mg/L as SO ₄	300	< 600
Total Hardness	mg/L as CaCO ₃	370	< 500
Calcium Hardness	mg/L as CaCO ₃	220	< 300
Ortho-Phosphate	mg/L as PO ₄	11	1.1 – 2.6
Total Phosphate	mg/L as PO ₄	12	1.4 – 3.1
Silica	mg/L as SiO ₂	14	< 40
Total Iron	mg/L as Fe	0.25	< 0.3
Copper	mg/L as Cu	0.016	< 0.14
Aluminum	mg/L as Al	0.2	< 0.4
TSS	mg/L	< 20	< 2
Free Chlorine	mg/L as Cl ₂	0.0	0.2 – 1.0
Total Coliform	MPN/100ml	TNTC	2.2

5 CONCEPTUAL DESIGN CRITERIA

The conceptual design criteria for the Brawley Tertiary Treatment System are summarized in the following Table.

Pretreatment	
Flash Mix	HRT: 40-50 seconds Dimensions: 6' (L) x 6' (W) x 12' (D), 3' freeboard Volume: 3200 gallons Flash Mix Pump: 200 gpm Coagulant Dosage: 50-150 mg/L Alum (100% strength) pH adjustment capability: caustic and sulfuric acid
Flocculation	2 parallel trains, 2 stages each HRT at design flow, each stage: 17-18 minutes Volume each stage: 36,000 gallons Dimensions each stage: 20' (L) x 20' (W) x 12' (D), 3' freeboard Mixers: 4- 25 HP, 2-speed motors
Sedimentation	2 parallel basins Overflow Rate: 1 gpm/sf Volume each stage: 180,000 gallons Dimensions: each 100' (L) x 20' (W) x 12' (D), 3' freeboard Effluent Weir Loading: 20,000 gpd/ ft; 150 LF each basin Chain and flight sludge collection
Chemical Feed and Storage Facilities	Alum Storage: 1 x 15,000 gal tank Polymer Storage: 2 x 55 gal tanks Caustic Storage: 1 x 2,000 gal tank Sulfuric Acid Storage: 1 x 100 gallon tank Chlorine (Sodium Hypochlorite) Storage: 2x 3,000 gal tanks Alum Dosing Equip: 1 gpm Building Dimensions (Portion of Combined Chem/Elect Bldg): 50' (W) x 80' (L)
Filtration	
Gravity Multi-Media Filtration System	No. of Filters: 4 Filtration Rate: 4 gpm/ft ² w/1 unit offline Dimensions(each): 18.5' (L) x 18.5' (W) x 17' (H) Max BW rate: 5200 gpm
Backwash Waste Stream	Max. Daily volume: 160,000 gallons Equalization Volume: 120,000 gallons
Backwash Waste Return Capacity	200 gpm
Pumping	
Tertiary Inlet Pump Station	3 vertical centrifuge 480V motors 2 duty with VFD +1 standby (without VFD) Design Flow: 2,100 gpm each
Backwash Supply Pumps	3 vertical centrifuge 480V motors 2 duty with VFD +1 standby (without VFD) Design Flow: 2,500 gpm each
Tertiary Effluent Pump Station	3 vertical centrifuge 480V motors 2 duty with VFD +1 standby (without VFD) Design Flow: 2,100 gpm each

6 PROJECT LAYOUT

The proposed site layout for the preferred project is shown in the Figure #4 – Site Plan Layout, for the centrifuge system in Figure #5 – Centrifuge and Solids Drying Beds Layout and for the disinfected tertiary effluent pump station in Figure #6 – Yard Piping and Pump Station Layout.

The major treatment equipment would be located in Pond S2 (second pond from the north). The new tertiary system centrifuge would be located adjacent to the existing centrifuge for the secondary sludge. The 6.0 MG equalization pond would be located within the existing Pond S3 (the most northern pond) and the tertiary effluent pump station would be located at the southwest corner of this pond. An access road has been designed around the tertiary treatment plant for ease of access and maintenance. The southeast corner of Pond S2 would be filled and the electrical equipment and chemical feed system would be located in this area. Both the electrical equipment and the chemical feed system would be in an air conditioned building. This building is located on the fill at a higher elevation to prevent any flood damage in case of a storm.

The preliminary hydraulic profile of the conceptual design is shown in Figure #7 – Hydraulic Profiles.

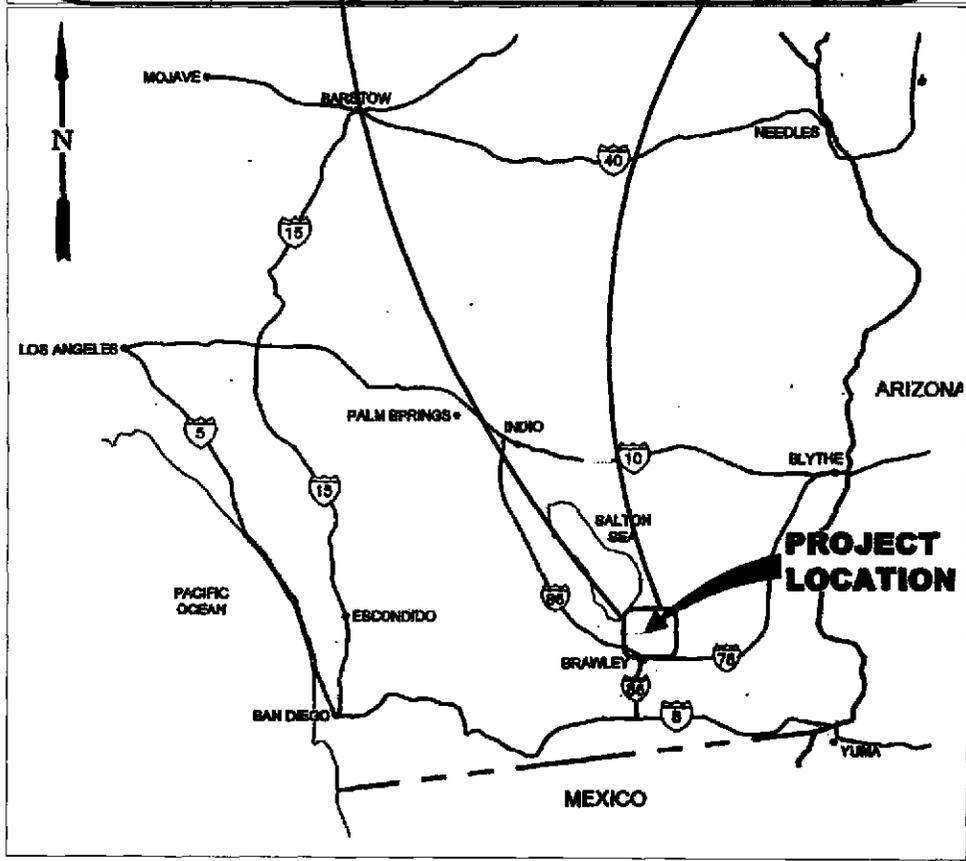
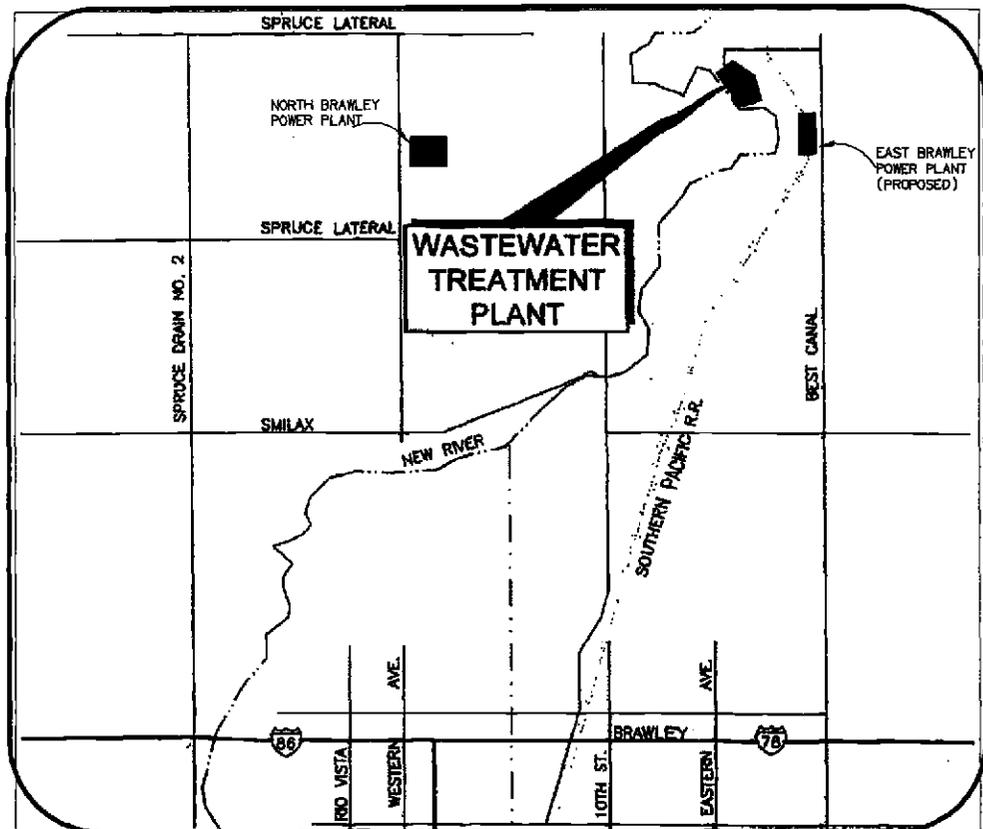
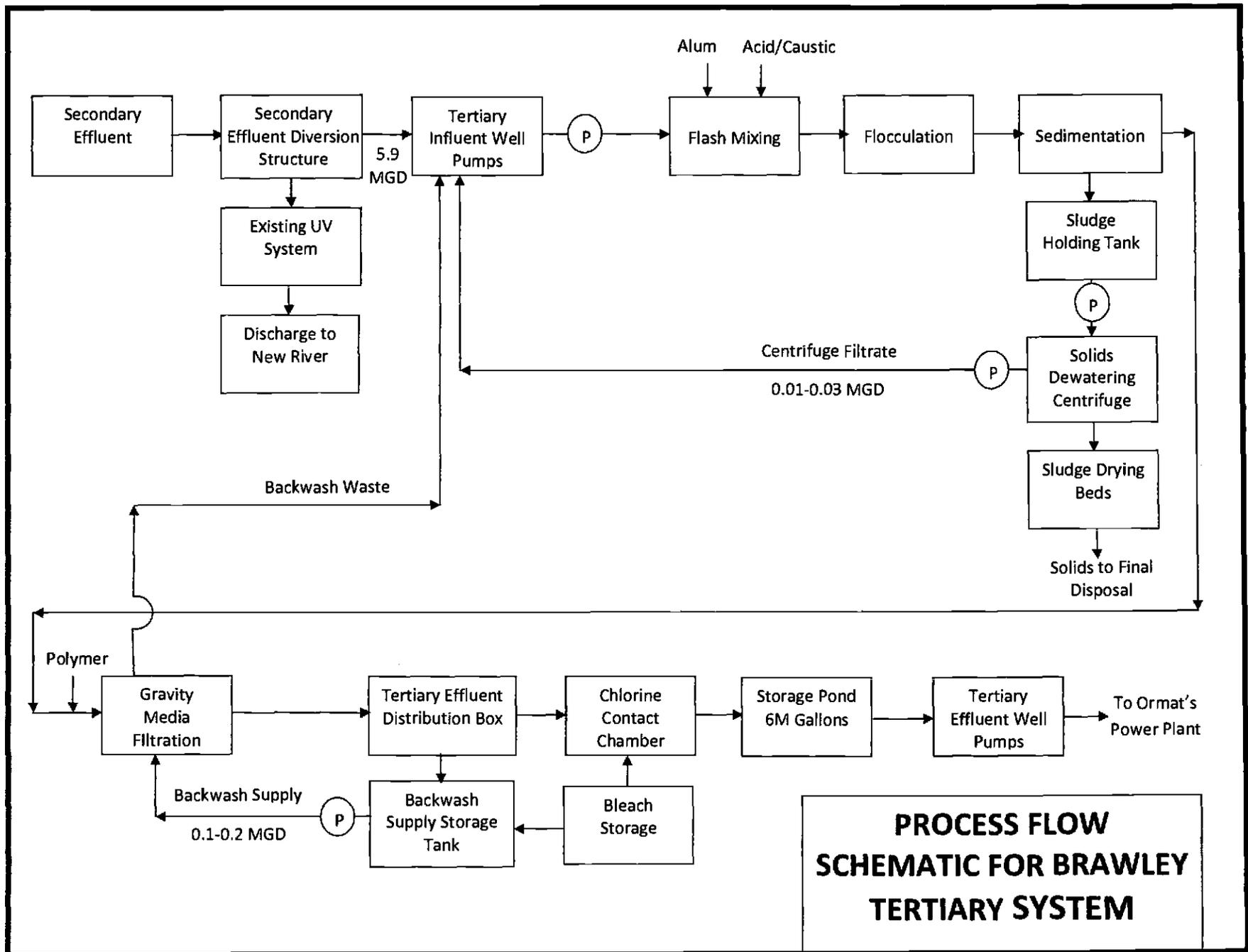
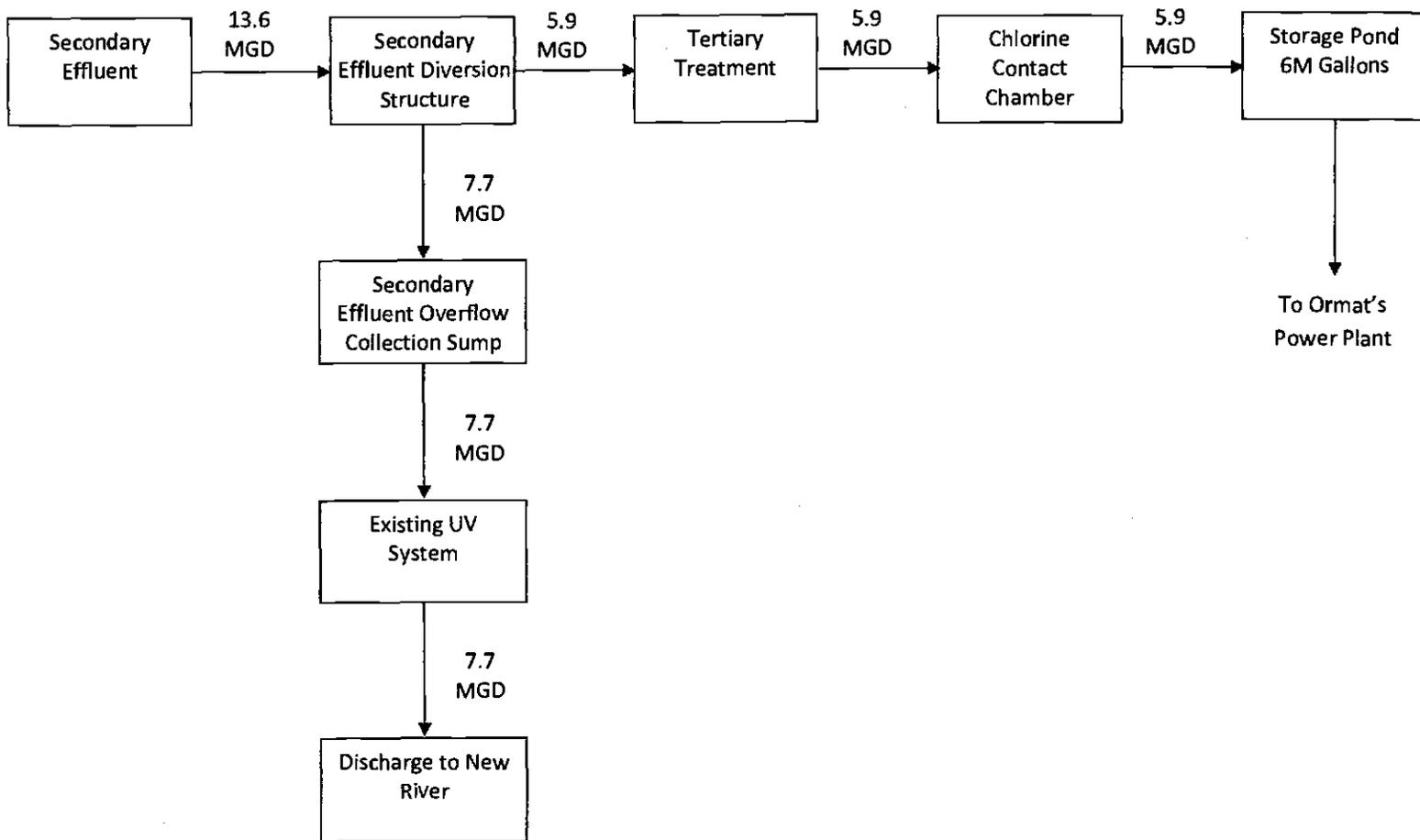
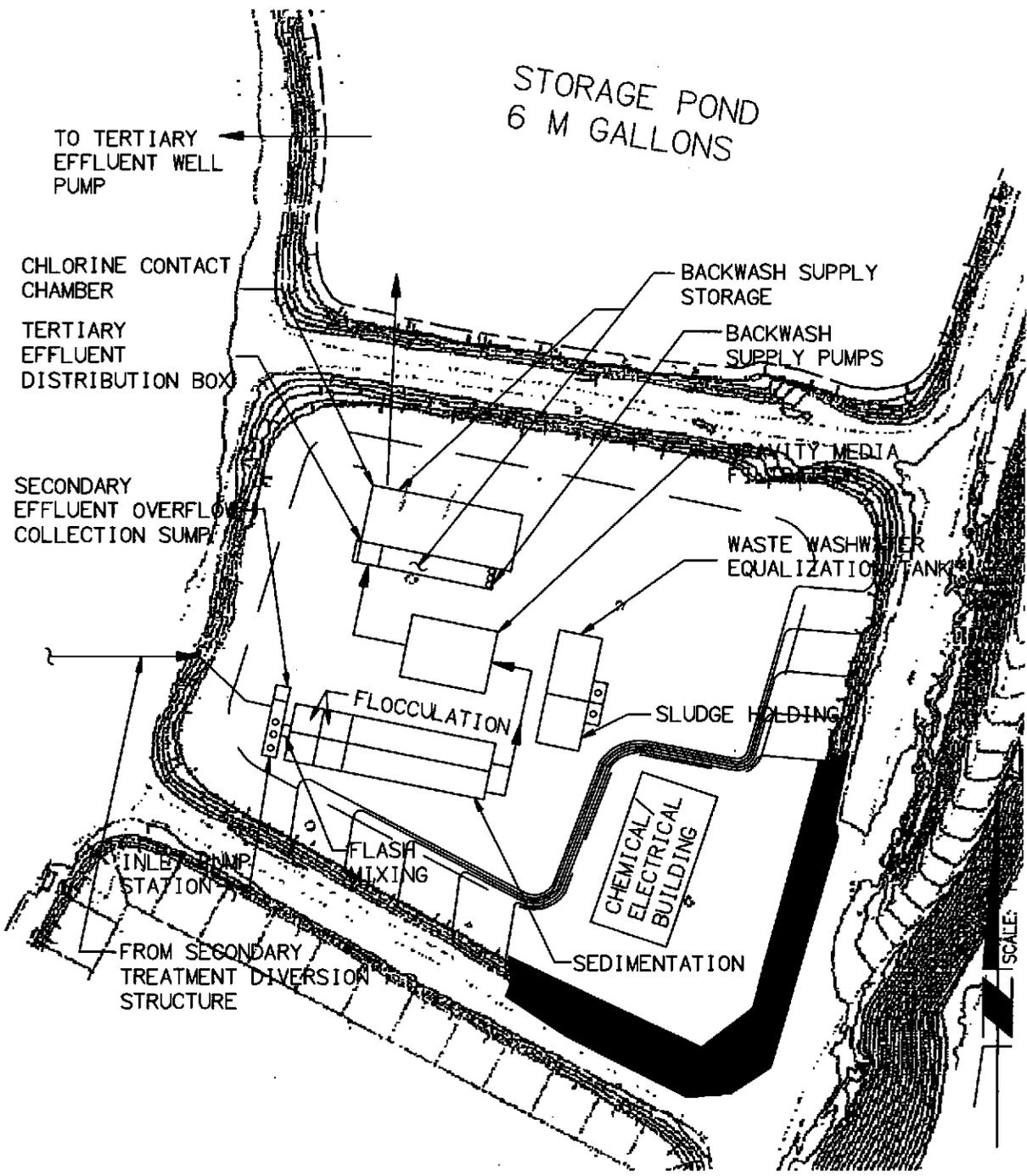


FIGURE 1-1
PROJECT LOCATION

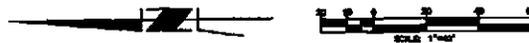
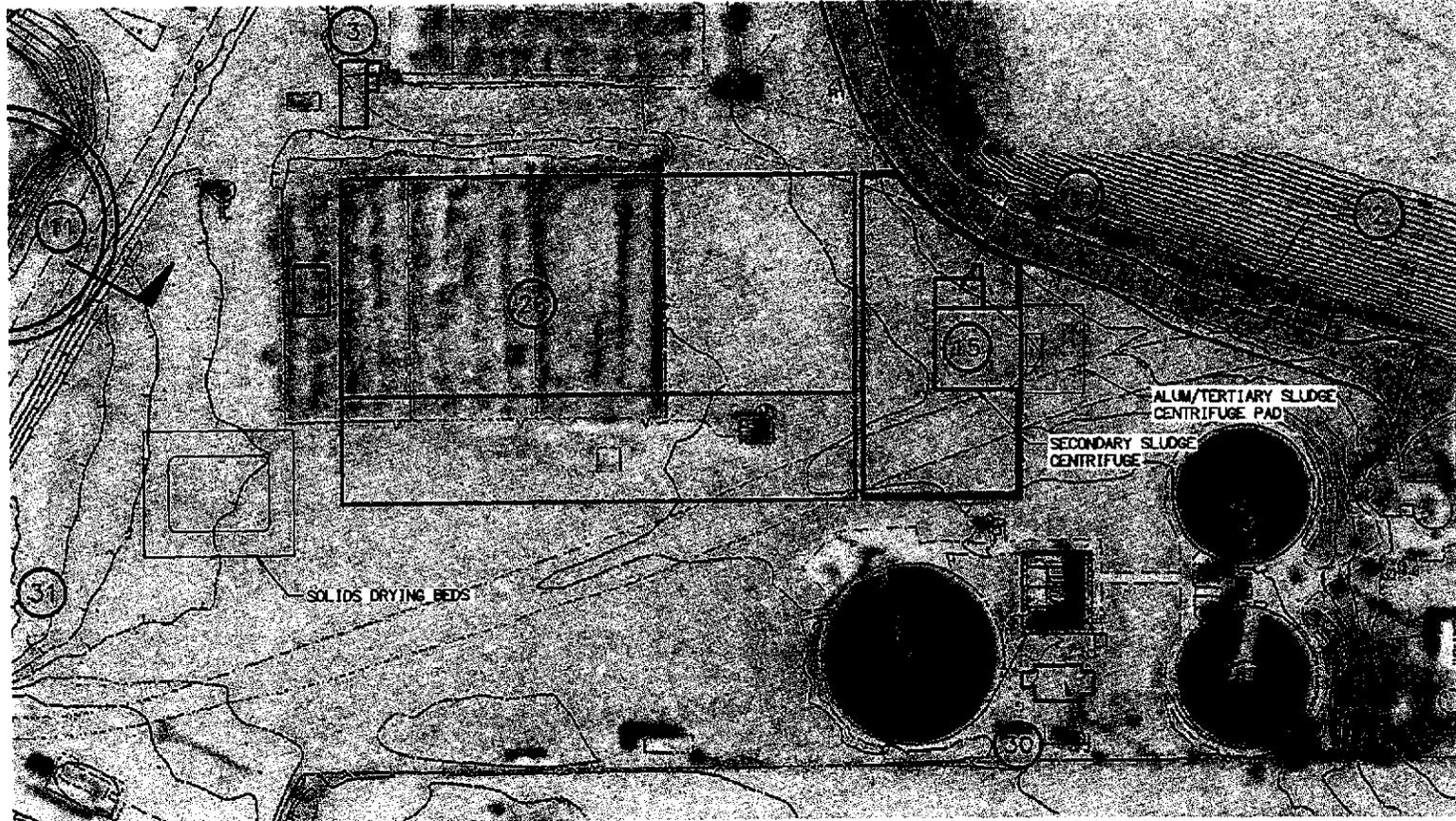




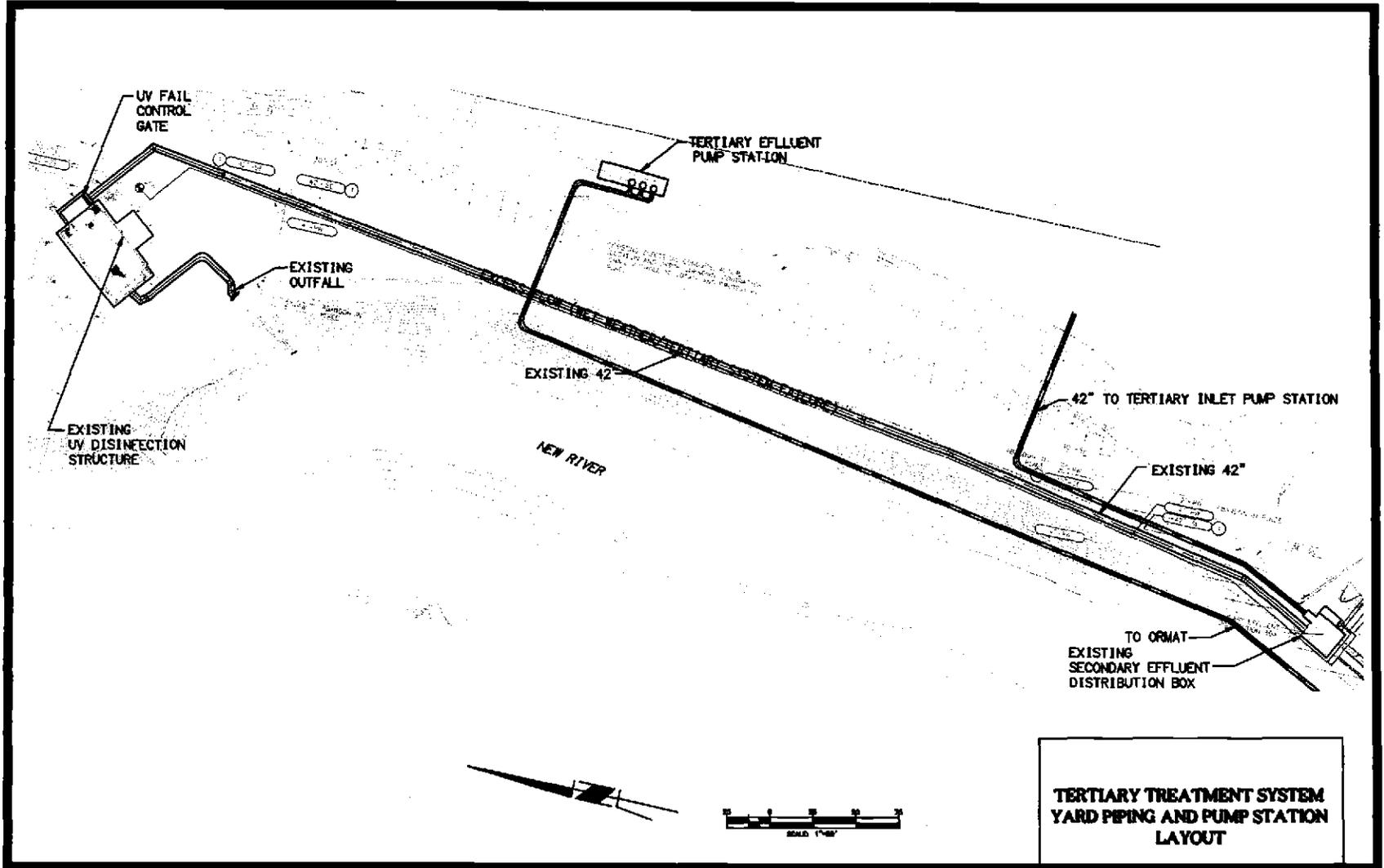
**PROCESS FLOW
WET WEATHER SCHEMATIC
FOR BRAWLEY TERTIARY**

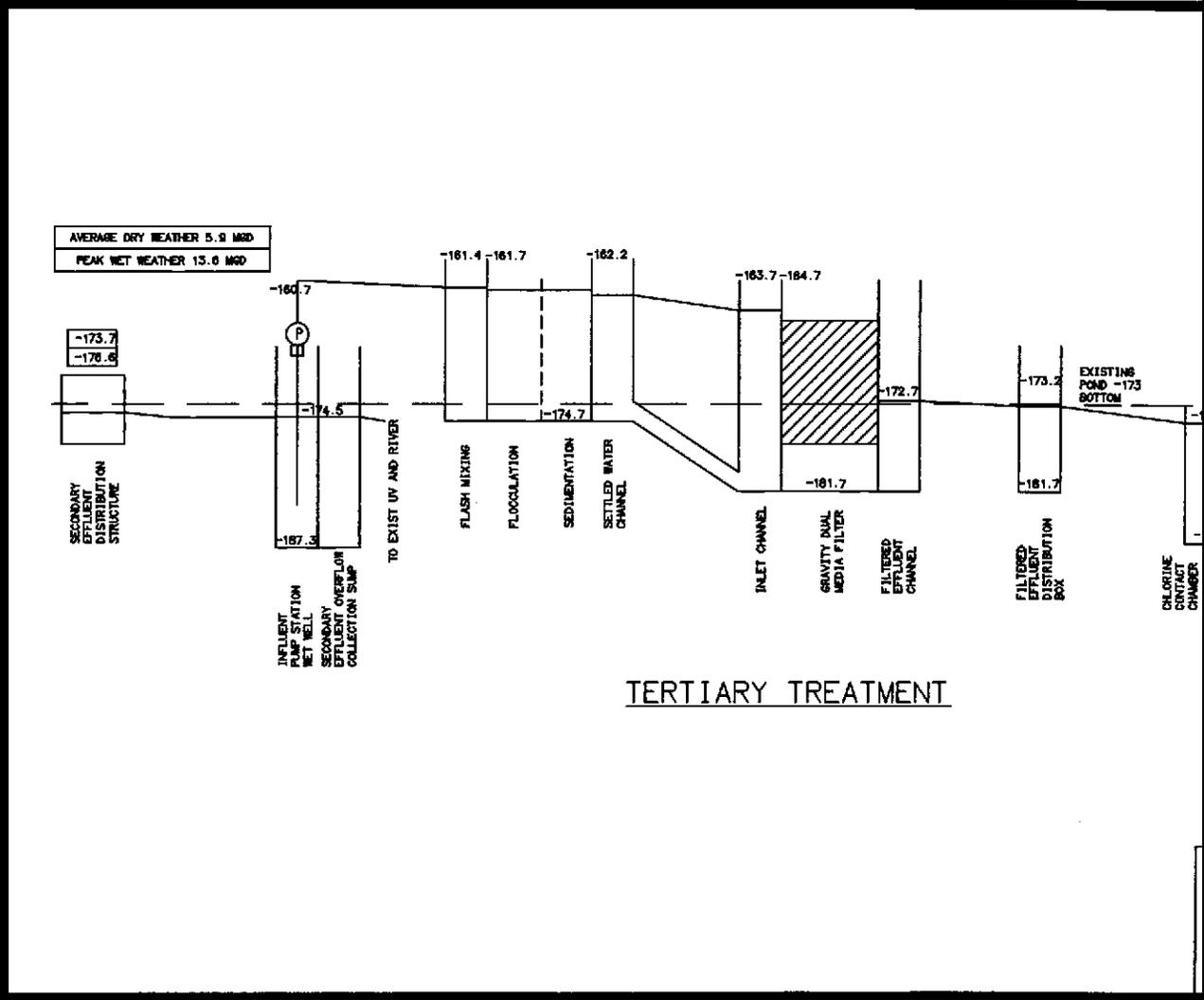


**SITE PLAN FOR BRAWLEY
TERTIARY TREATMENT
SYSTEM**



**TERTIARY TREATMENT SYSTEM
CENTRIFUGE & SOLIDS DRYING BED
LAYOUT**





AVERAGE DRY WEATHER 5.9 MGD
 PEAK WET WEATHER 15.6 MGD

TERTIARY TREATMENT

Attachment L



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STATE OF CALIFORNIA
 STATE ENERGY RESOURCES CONSERVATION
 AND DEVELOPMENT COMMISSION

In the Matter of:)
)
 Staff Investigation of Possible)
 Energy Commission Power Facility)
 Siting Jurisdiction over Five)
 30 Megawatt Units Known as)
 LuzSegs Units III-VII)

RESOLUTION PROVIDING
 DIRECTION TO STAFF

Since the suspension by the California Public Utilities Commission of its interim Standard Offer Nos. 4 and 2, this Commission has experienced a marked increase in its power facility siting workload. Along with this increased siting activity, the Commission has also received comments from utilities and applicants who are seeking licensing under the Warren-Alquist Act suggesting that many projects that would normally come under our jurisdiction are now being pursued in avoidance of the Commission's permit process because of the potential that this Commission may find some of these projects not in conformity with the Commission's electricity demand forecasts and integrated need assessments. See Public Resources Code §§ 25523(f), 25524. It is clear to the Commission that in order for its jurisdiction over generation facilities to be equitably administered, the Commission must assert its jurisdiction in an even-handed fashion when it appears that there is a reasonable basis for doing so. Thus the staff of the Commission has been conducting a general investigation of projects that claim to be outside the Commission's jurisdiction in order to make recommendations to the Commission as to whether and how to proceed to bring projects that must be licensed under the Warren-Alquist Act into compliance with the law.

As part of this general investigation, the staff has identified a unique installation of solar powered generation equipment in San Bernardino County consisting of five 30 megawatt generation units known as LuzSegs Units III, IV, V, VI, and VII. Staff has determined that these facilities are on contiguous parcels, that the facilities have all been designed and are being installed and operated by the same organization, and that the energy and environmental impact of the facilities is that of a

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 STATE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION

150 megawatt facility.¹ Staff therefore will recommend that the Commission assert its jurisdiction to license these facilities. The common project proponent, Luz Engineering Corporation (LUZ) questions the jurisdiction of the Commission, pointing out (1) that each of the five projects has been recognized as an individual 30 megawatt unit for purposes of qualifying under the Public Utility Regulatory Policy Act of 1978 (PURPA) as a small power producer, (2) that each unit will be separately owned by a limited partnership (with LUZ as the general partner), (3) that each unit has its own SO 4 contract with Southern California Edison Company, and (4) that substantial amounts of equipment (e.g. generators, supplementary boilers, solar collector fields, cooling towers, etc.) are not commonly shared among units because of the need to qualify as separate projects for purposes of PURPA. LUZ also argues that the nominal accumulated 150 MW of capacity of the facilities must be derated by at least 33 1/3 percent because of the nature of the solar technology, and further, that LUZ's actions are justified because LUZ has not had the benefit of any regulations by the CEC specifically indicating that it has jurisdiction over groups of facilities that separately are all below 50 MW but taken together are 50 MW or more.

While it appears, without full factual inquiry into the matter, that staff may be correct in its conclusions regarding the applicability of the Commission's jurisdiction over these facilities, there are other complicating factors that require careful consideration and potential exercise of prosecutorial discretion by the Commission. First, this Commission has, since its inception in 1975, encouraged the development of increased generation capacity using renewable (non-depleting) fuels. For many years, the Commission has also recognized and emphasized the value in diversifying the state's portfolio of generation sources in order to decrease the state's current over-reliance on oil- and natural gas-fired generation technologies so that the state would be less dependent upon fuels that may become scarce or very expensive in the long term. Additionally, in its most recent Electricity Report, the Commission emphasized the need for generation technologies that could or would follow or match the generation system's loads, being more available during system peaks and less available at other times when the needs are lower. Based on representations of LUZ, the LuzSegs project appears to be strong in each of these areas. If these representations are true, then it would be inconsistent with long-standing Commission policy for the Commission to take action that prevents these projects from coming to fruition.

LUZ also represents to the Commission, however, that the financing for its unique project is in jeopardy if the Commission questions the continuing viability of the project by commencing

¹ A more detailed description of the project and its common proponents is provided in the attached Appendix I.

formal complaint and investigatory procedures to require licensing of the project under the Warren-Alquist Act. Based on the investigation by staff, it appears that construction of the first two of the five units is, at this time, substantially complete, and that substantial construction on the third unit has also occurred. In addition, LUZ has recently commenced on-site construction of the fourth unit in order to meet an October 31, 1986 deadline for commencement of construction in order to qualify the project for solar tax credit treatment in the 1987 tax year. LUZ has represented that it will not commence construction on any other units, including Unit VII, without having obtained either a determination that the Commission has no jurisdiction or an appropriate certification to proceed from the Energy Commission.

The Commission regrets that the project proponent commenced construction without seeking a determination whether a Commission license would be required since it is this unfortunate action that now leaves so little time for the Commission to work on potential solutions to the dilemma faced by LUZ. Nonetheless, while it would have been a more prudent course to inquire in advance of commencing construction as to the Commission's view of its jurisdiction over the project, the Commission has no evidence suggesting that LUZ has intentionally sought to circumvent the statutory requirements of the Warren-Alquist Act. The Commission does not find the arguments made by LUZ as to the Commission's jurisdiction over the project to be compelling. Nonetheless, the Commission believes that LUZ makes these arguments in good faith and that when LUZ commenced construction, it believed, based upon the advice of counsel, that it could legally proceed without obtaining certification under the Warren-Alquist Act.²

Given both the apparent lack of intent to violate any

² This conclusion might be most strongly questioned with respect to the relatively recent commencement of construction of Unit VI while the applicant had clear notice that the staff's investigation was in progress. Nevertheless, it appears from the unusual facts in this case that avoidance of CEC jurisdiction was not the motivating factor behind this action. Instead, from LUZ's perspective, the October 31, 1986 deadline for commencement of construction in the income tax laws virtually compelled LUZ to proceed with construction and then assert its defenses if necessary to the question of our jurisdiction since eligibility for the solar tax credit is apparently a major factor in the economic feasibility of developing this new technology. The CEC has long supported the solar tax credit at both the state and federal levels in order to create just this type of incentive so that this kind of project would be able to proceed. Thus in this unique case, it appears to be more important to focus on what environmental damage may have been done and what mitigation is appropriate than to focus on the past actions of the developer.

provision of law and the potentially substantial benefits the project may provide the state, the Commission is inclined to try to find a way to resolve the problems that could result from our jurisdiction over these facilities. Nevertheless, we must find such solutions within the framework of the statutes that we administer. As a matter of law, subject matter jurisdiction either exists or it does not exist. We can neither waive it if it does exist, nor create it by stipulation if it does not. Marin Municipal Water District v. North Coast Water Co. (1918) 178 Cal. 324, 173 P. 473, 474. On the other hand, the Warren-Alquist Act does not require us to bring suit to enjoin a potential or alleged violation where the party in question appears before the Commission in good faith and seeks licensing in accordance with the Act. Staff has indicated that with a cooperative applicant, an AFC for a project of this type could probably be processed in 7 to 8 months. The principal issues we would anticipate in the proceeding relate to the environmental impacts of construction in this area which appears to support protected and endangered species.³ Work needs to be done to determine from data available on site or from surrounding areas what species may have existed on the site before construction began, what environmental mitigation measures would have been recommended based on a projection of the likely species involved, and what appropriate mitigation measures can now be devised to compensate for the damage that has already occurred as a result of construction of the facilities.

The most difficult question for the Commission is what action, if any, to take with respect to the construction which we understand is continuing on the site. From an enforcement perspective, the appropriate action is to order construction to halt until the Commission has completed its licensing proceeding. Unfortunately, this action does nothing to undo the potential environmental harm that is likely to have occurred up to this point, and it may jeopardize the success of a unique project that the Commission, from the perspective of its long-standing energy policy, would like to see succeed. Thus while ordering a halt to construction at this point would send an appropriate message to similarly situated developers that the Commission will not tolerate avoidance of its jurisdiction, this benefit must be weighed against the high probability, based on representations by LUZ, that ordering a halt to construction would irrevocably

³ One issue that apparently troubles staff is the indication, from documents it has examined, that LUZ has been less than fully co-operative with San Bernardino County and Department of Fish and Game in following through on mitigation measures that were discussed when the facilities were originally licensed at the local level. Staff and LUZ need to develop further information on this subject, but statements by LUZ under oath at the hearing on October 29, 1986 on this resolution suggest that one of the main problems, payment for land to be set aside as part of a desert tortoise reserve, has now been resolved.

destroy this unique and potentially desirable project's financial integrity. If the project fails as a result of inability to obtain financing or tax credits, the environmental values that might be served through a mitigation plan to be developed in the AFC process would not be furthered. On the other hand, if the Commission exercises its prosecutorial discretion, taking no action to prevent the project from proceeding forward, it may be possible to allow the project to proceed successfully while at the same time obtaining appropriate compensating mitigation for the damage done as a result of premature construction. Without in any way suggesting that this resolution of the issue would be appropriate in a case involving a project with less significance in terms of California energy policy,⁴ the Commission is inclined to exercise its prosecutorial discretion as described above if

- ① LUZ begins immediately to work with staff to develop and process the necessary AFC for its project, and
- ② LUZ satisfies staff within 30 days of this resolution that it has undertaken every action required of it in its previous dealings with the San Bernardino County and the Department of Fish and Game relating to mitigation of biological impacts on the site.

The Commission cannot and does not prejudge any of the issues that may arise during the licensing proceedings contemplated above. Nevertheless, we do note that our judgment not to pursue the full range of potential remedies that might be available if it were determined that LUZ had willfully violated our power facility siting jurisdiction is based in part on several factors that suggest that the LUZ facilities will likely be able to be licensed under the Warren-Alquist Act given

⁴ Indeed, this resolution should not be read to create a broad new remedy for parties who have commenced construction prior to seeking licensing from the Commission. The Commission's decision to exercise prosecutorial discretion in this case is based on all of the unique facts of this particular case including, but not limited to, ① the fact that this is the first major solar thermal installation in California, ② that it appears to match SCE's load almost perfectly, that LUZ has testified that it will save the energy equivalent of approximately 750,000 barrels of oil per year, and that based on testimony received, it appears that there is no known opposition to the project even among the environmental organizations who might be most likely to raise concerns about its impacts and who were consulted when the LUZ project was being reviewed at the county level. While the Commission does not totally foreclose the possibility that it might find grounds to exercise prosecutorial discretion in another case as well, it does firmly indicate that the process of continuing construction during the course of licensing is strongly disfavored as a general principle and should be tolerated only in the most unusual and compelling circumstances.

adequate cooperation by LUZ.⁵ First, in most power facility siting cases today, the most difficult issue is need for the power to be generated by the facility. We note that in the fifth Electricity Report (ER V), the Commission set aside 300 megawatts of reserved need for solar powered generation in order to encourage the development of this technology and the diversification of the state's generation system by offering solar projects the easiest of four need tests developed in ER V. The LUZ project is the first to bid for permission to fill that reserved need. Moreover, it appears from testimony by LUZ, that this project is designed to follow or "match" the Southern California Edison Co. peak loads very well, thus suggesting that it would be a logical addition to the Edison system even if the ER V methodology for need determinations is changed in the upcoming adoption of ER VI. Additionally, we note that environmental documentation has already been prepared for San Bernardino county's review and that the county permitted the projects to proceed based on a negative declaration--a finding that the projects would have no significant adverse environmental effects. This Commission is not legally bound to concur with the county's finding, and based upon staff preliminary review, probably would not concur, but the existence of this previous review suggests that the possible environmental concerns can be overcome through appropriate mitigation.

Based on all of the foregoing, the Commission therefore directs its staff as follows:

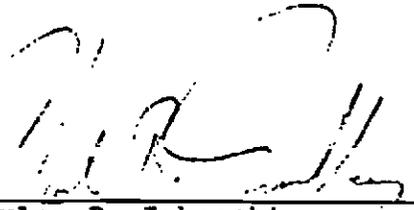
(1) If an application for certification of LuzSegs Units III, IV, V, VI and VII is filed and deemed adequate on or before January 7, 1987, staff shall endeavor to bring the matter to the full Commission for decision no later than September 9, 1987.

(2) So long as LUZ proceeds to remedy the jurisdictional problems identified by staff in accordance with the procedure set forth herein, the Commission resolves that it will not seek any injunctive relief or in any way attempt to interfere with the construction or operation of LuzSegs Units III, IV, V, and VI. Pursuant to agreements made on the record of the Commission's hearing on this matter, LUZ shall halt construction on Unit VI for a period of 7 days in order to permit the staff to visit the site and observe it prior to any further construction. Ground-breaking for Unit VII shall not commence until the Commission has licensed those facilities since such construction activity could disrupt environmental evaluation and mitigation work necessary to license the facilities.

⁵ Any substantial doubts about the likelihood of success in obtaining certification would obviously militate against the exercise of prosecutorial discretion.

(3) Staff shall report back to the Commission periodically on the progress of work with LUZ to resolve these jurisdictional problems and any problems that develop during the course of licensing work.

DATED: October 29, 1986



Charles R. Imbrecht
Chairman

APPENDIX I

The project proponent, Luz Engineering Corporation (LUZ), utilizes parabolic trough reflectors that focus the sun's rays on evacuated tubes carrying heat transfer fluid. The heat exchange unit is used to generate steam. The steam is then superheated in a supplementary gas-fired boiler. The superheated steam produces electric energy in a steam turbine-generator. The design is represented as unique, even among solar projects, for its ability to generate steam in the supplemental boiler, which allows production of electric energy at any time. Within the 25% fossil fuel limitation imposed on PURPA Small Power Producers, the equipment can generate electricity using natural gas during all winter evening peak hours.

LUZ is a California corporation which designs, finances, and constructs solar electric generating systems (SEGS). In addition to the units (III-VII) under review, LUZ plans six more 30 MW facilities (at unspecified locations). LUZ maintains that it organizes these projects solely for the purpose of selling its solar hardware equipment to the individual partnerships. LUZ is the managing general partner in each limited partnership.

On April 17, 1985, LUZ executed individual power sales agreements (S04) with SCE on behalf of five limited partnerships.

The land is owned by or under option to LUZ, who will lease to each unit. In September 1985, the existing limited partnerships contracted with Blount Constructors (a division of Blount International Limited) for turn-key work including engineering, procurement, and construction. In October 1985, Blount International Ltd. contracted with Westinghouse for the design and supply of each unit's power block. Luz Industries Israel (a Luz International Limited subsidiary) was individually contracted to

provide solar field design and hardware. Cogeneration National Corporation Southern Division was selected as the engineer for plant integration. Each unit separately appointed Cogeneration National Corporation Northern Division as "owner representative" and overseer of Blount's contract.

On October 15, 1985, LUZ submitted applications for individual site certifications by the County of San Bernardino. On December 3, 1985, the County issued mitigated negative declarations of environmental significance, and approved all applications on December 20, 1985. Individual applications for Authorities to Construct are being currently processed for each unit. However, the developer is participating in a San Bernardino County Air Pollution Control District (SBAPCD) evaluation of the cumulative NOx emissions standard. SBAPCD consultation with the ARB to confirm satisfaction of state modeling and monitoring requirements is planned. The developer will also be meeting with the EPA to confirm compliance with PSD requirements (although cumulative emissions analysis indicates that annual emissions will not exceed EPA threshold values).

Units III-VII are proposed at land owned or under option to LUZ (to be leased for the term of the project to each limited partnership) at Kramer Junction, San Bernardino County:

<u>Unit</u>	<u>Construction Start Date</u>	<u>Owner*</u>	<u>Net Generating Capacity</u>
III	12/85	LuzSegs Partners III	30 MW
IV	12/85	LuzSegs Partners IV	"
V	7/86	LuzSegs Partners V	"
VI	12/86	LuzSegs Partners VI	"
VII	7/87	LuzSegs Partners VII	"

*LUZ is the general partner in each partnership, and will exercise general management and control of all units. The only executed partnership agreement provided for review indicates that for Unit IV, LUZ is entitled to 100% of profits and losses.

All units were conceived and developed simultaneously by LUZ. Because of the ownership arrangements, LUZ will continue participating in each unit as land owner, general partner, and potential central operations manager.

On July 10, 1986, LUZ described these units as follows:

"Luz Engineering Corporation was the solar system supplier for two previous solar electric generating systems known as SEGS I and SEGS II. Both of these projects were constructed on land leased from Southern California Edison Company at Daggett, California. Due to the successful startup of SEGS I in December, 1984 and the commencement of construction of SEGS II in early 1985, Luz proceeded to conceive a plan for five

additional projects in the Mojave Desert Region. Consequently, land at Kramer Junction was purchased (or optioned) and five separate Standard Offer No. 4 contracts were executed with Southern California Edison Company on April 17, 1985. Subsequent Interconnect Facility Agreements were approved and executed between each of Luz Solar Partners Limited, III, IV, V, VI and VII and SCE on February 19, 1986." [Emphasis added.]

According to LUZ, each unit was FERC-certified as a separate project because the 30 MW generating capacity is the maximum size allowed by FERC.

Staff has disregarded the FERC designation of separate QFs as a basis for treating the LUZ units as single projects and maintains that for environmental and energy supply purposes, evaluation of the LUZ projects as a single powerplant is not precluded by federal designations. In the Unit I FERC decision, the Secretary specifically noted:

"Certification as a qualifying facility serves only to establish eligibility for benefits provided by the Public Utility Regulatory Policies Act of 1978, as implemented by the Commission's regulations, 18 CFR Part 292. It does not relieve a facility of any other requirements of local, state or federal law, including those regarding siting, construction, operation, licensing and pollution abatement. Certification does not establish any property rights, resolve competing claims for a site, or authorize construction." (Docket No. QF84-434-000, 2/6/85)

Units III and IV were simultaneously constructed. Units V-VII are planned for sequential construction to be completed within approximately 16 months of Unit III and IV. According to LUZ, the staggered schedule is required to effect a pre-construction financing strategy.

As general partner, LUZ will exercise complete management control over all units. Moreover, Luz and Cogeneration National (as a joint venture) will offer each partnership (of which LUZ is the controlling manager-general partner) an "operations contract" (7/10/86 submittal, p. 8).

All units are identically designed and proposed at a common location which is property owned or controlled by LUZ. Each 160 acre fenced parcel contains a solar field and power block and is physically separated from the other parcels by 125 feet buffer areas (on which utility and access roads are placed).

According to LUZ, the following equipment is not shared:

Turbine/Generator Unit. Condenser and feedwater Heaters. Solar Heat Transfer System/Power Cycle Preheaters, Steam Generators and Steam Superheaters. Supplementary Natural Gas Boiler and all support equipment thereto. Power Cycle Condensate

and Feedwater Pumps. Turbine Lube Oil System. Heat Transfer Fluid system including all pumps, instrumentation, controls and expansion tank. Solar Collector Field of approximately 200,000 square meters. Cooling Tower. Demineralizer Treatment Water System. Instrument Air System. Plant Air System. Control Building and all Plant Control Systems. Plant Lighting System. Plant Electrical System with Motor Control Centers. Plant Transformers. Plant Circuit Breakers. Switchyard. Solar Field Header Piping. Solar Field Roads. Water Storage Tank. Water Transfer Pumps. Fire Protection Pumps. Fire Protection System. Evaporation Pond. Waste Water Neutralization System. Feedwater Chemical Treatment System. Plant Parking Area. Natural Gas Reducing and Metering Station. Electrical Metering Station. Water Metering Station. Emergency Oil Heater System. Emergency Power Diesel Generator. Spare Parts Inventory. Sewage System. Condensate Storage Tanks. Electrical Grounding System. Wastewater Blowdown System and Piping.

Basically, the developer contends that the separate equipment is required to maintain the maximum legal design permissible to retain QF eligibility.

All units share utility services for water (pursuant to a "Cotenancy Agreement" for the construction, maintenance and operation of a water supply pipeline required by the local water district); electrical interconnection (owned, maintained, and operated by SCE); natural gas (installed, owned, maintained and operated by PGandE Company); and road access.

Each unit individually executed (or will execute) contracts for equipment purchases and procurement, engineering, and construction.

As designed, the units are physically separate, but with common operational management and common ownership interests.

EXHIBIT 2

EXHIBIT 2

STATE OF CALIFORNIA

Energy Resources Conservation
and Development Commission

In the Matter of:

Complaint & Investigation)
Jurisdictional Determination Regarding East and) Docket No. 11-CAI-02
North Brawley Geothermal Developments)
_____)

**VERIFIED ANSWER OF RESPONDENT ORMAT NEVADA, INC.
TO VERIFIED COMPLAINT AND REQUEST FOR INVESTIGATION BY
CALIFORNIA UNIONS FOR RELIABLE ENERGY**

Pursuant to the Commission's July 26, 2011 Scheduling Order, Ormat Nevada, Inc. ("Ormat" or "Respondent") hereby answers the Verified Complaint and Request for Investigation ("Complaint") by California Unions for Reliable Energy ("CURE" or "Complainant"), which was served upon Ormat on August 8, 2011.¹ Specific responses to the material allegations contained in CURE's Complaint required by Section 1233 of the Commission's Regulations are provided in Appendix A.

I. INTRODUCTION

Seeking leverage for a project labor agreement, CURE has filed this complaint alleging that Ormat's North Brawley Geothermal Development Project ("North Brawley")² and East Brawley Geothermal Development Project ("East Brawley")³ are subject to the exclusive licensing jurisdiction of this Commission rather than Imperial County.⁴ CURE alleges (1) that these two facilities are subject to licensing by the California Energy Commission ("Commission" or "CEC") as a single facility, or, in the alternative, that each individual facility is subject to the Commission's jurisdiction on the basis that the generating capacity of each power plant is 50 MW, and (2) that Ormat has violated the Warren-Alquist Act by failing to seek licensing of North Brawley and East Brawley by the Commission. CURE fails to use the Commission's

¹ As indicated in the Commission's Letter Regarding Proper Service of Complaint Upon Ormat, dated August 8, 2011, Ormat was not properly served on July 26, 2011 due to an administrative error.

² North Brawley was developed by ORN1 18, LLC, a subsidiary of Ormat.

³ East Brawley was developed by ORN1 19, LLC, a subsidiary of Ormat.

⁴ Verified Complaint and Request for Investigation by California Unions for Reliable Energy, 11-CAI-02 pp. 1, 6 (June 28, 2011) ("CURE Complaint").

adopted method of calculating generating capacity to support its allegations, and fails to provide any factual support beyond conclusory accusations and misrepresentations of the specific project details of North Brawley and East Brawley renders CURE's Complaint fatally flawed. CURE's Complaint must be denied as CURE has failed to set forth a prima facie case supporting its allegations. Moreover, CURE's complaint is also barred by the doctrine of laches as it is untimely, particularly with regard to the North Brawley Project that is already built and operating pursuant to county permits issued on November 27, 2007. These permits were reasonably relied upon by Ormat for the expenditure of substantial time, money, and resources to develop the facility. Ormat has filed a concurrent Motion to Dismiss the Complaint, and incorporates by reference all facts and arguments thereto.

II. DISCUSSION.

A. CURE's Complaint fails to make a prima facie case regarding the generating capacity of North Brawley and East Brawley, and should be dismissed without further hearing.

Section 2003 of the Commission's regulations contains a specific methodology for assessing the generating capacity of thermal power plants for the purpose of evaluating the Commission's jurisdiction over the licensing of a thermal power plant project. CURE's Complaint conspicuously fails to use the Commission's adopted method in asserting that the generating capacity of each facility, North Brawley and East Brawley, is 50 MW or more.⁵ As such, CURE has failed to make a prima facie case that either North Brawley or East Brawley are subject to the Commission's jurisdiction. As discussed below, the generating capacities of both North Brawley and East Brawley, as calculated pursuant to the Commission's methodology, are each 49.5 MW. CURE's Complaint not only offers no facts supporting a different conclusion, it never even asserts a contrary position. Therefore, using the Commission's methodology, it is uncontested that neither North Brawley nor East Brawley are subject to the Commission's jurisdiction, and CURE's Complaint should be dismissed.

⁵ Public Resources Code Section 25120 defines the Commission's jurisdiction to apply to thermal powerplants "with a generating capacity of **50 megawatts** or more." Thermal powerplants with a generating capacity less than 50 MW are exempt from the Commission's jurisdiction.

1. Pursuant to the methodology established by Section 2003 of the Commission's regulations for determining the Commission's jurisdiction the generating capacity of each facility (North Brawley and East Brawley) is less than 50 megawatts.

CURE's Complaint does not apply the Commission's regulations on calculating generating capacity to the specific engineering characteristics of North Brawley and East Brawley. As set forth in Section 2003 of the Commission's regulations, the generating capacity of an electrical generating facility is the difference between the maximum gross rating of the plant's turbine generator(s) in megawatts, at the steam conditions and at those extraction and induction conditions which yield the highest generating capacity on a continuous basis,⁶ and the minimum auxiliary load for the facility.⁷ For geothermal facilities, such as the North Brawley and East Brawley, the minimum auxiliary load includes the minimum electrical operating requirements for the associated geothermal field which are necessary for and supplied directly by the power plant.⁸

a. North Brawley

The generating capacity of North Brawley, as calculated pursuant to the Commission's methodology, is 49.5 MW based on the following figures. The gross rating of the facility's five Ormat Energy Converter ("OEC") binary generating units is 72.8 MW, based on a baseload operation mode. North Brawley's electrical losses are 0.70 MW. In addition, the minimum auxiliary load for North Brawley is 22.60 MW, which includes 3.63 MW for the OEC pumps, 0.20 MW for the OEC auxiliary load, 2.55 MW for the cooling tower fans, 2.75 MW for the cooling tower pumps, and 10.10 MW for the production wells pumps.

b. East Brawley

The generating capacity of East Brawley, as calculated pursuant to the Commission's methodology is, 49.5 MW based on the following figures. The gross rating of the facility is 69.75 MW, based on a baseload operation mode. East Brawley's electrical losses will be 0.63 MW. East Brawley's minimum auxiliary load is 19.62 MW, which includes 3.60 MW for the OEC pumps, 0.20 MW for the OEC auxiliary load, 2.55 MW for the cooling tower fans, 2.75 MW for cooling tower pumps, and 7.75 MW for production wells pumps.

⁶ 20 C.C.R. § 2003(b)(1); this is the provision for steam turbine generators. Combustion turbine generators are subject to different requirements to determine the maximum gross rating. It should be noted that neither North Brawley nor East Brawley utilize steam, but rather use Vaporized fluid for generating purposes.

⁷ 20 C.C.R. § 2003.

⁸ 20 C.C.R. § 2003(c).

c. Resource limitations make generation of 50 MW or more at each Project Impossible.

In addition to the fact that the generating capacity of each facility is less than 50 MW when calculated pursuant to the Commission's prescribed methodology, there are resource limitations at the site of each project that independently make generation of 50 MW or more of net capacity impossible. Based on the recent capacity demonstration for North Brawley, which is the best method to determine the generating capacity of the facility, the geothermal field for North Brawley are able to sustain approximately 33 MW of net output. Thus, even if the generating equipment was resized to generate 50 MW or more using the Commission's calculation method, the power plant is not physically capable of generating anywhere near 50 MW, given the resource constraints. Therefore, North Brawley is not subject to the Commission's jurisdiction.

Due to similar resource constraints, current development plans at East Brawley, which will be designed to maximize use of the available resource, include the installation of only three OEC units. The gross capacity of these units will be 41.85, with an expected net output of 29.7 MW. Therefore, due to the resource limitations at East Brawley, the proposed facility will not be capable of a generating capacity of 50 MW or more, and the plant would not be subject to the Commission's jurisdiction.

2. Reference to capacity in a power purchase agreement ("PPA") is irrelevant to the Commission's determination of a thermal power plant's generating capacity under Section 2003 of the Commission's Regulations.

CURE's allegation that the generating capacities of North Brawley and East Brawley are each 50 MW is based solely on language from a California Public Utilities Commission resolution describing the contract capacity of the North Brawley Project. The contract capacity for that project was originally described as 50 MW but was subsequently reduced to 33.178 MW on June 6, 2011.

The contract capacity referenced in a PPA is simply irrelevant in determining whether the generating capacity of a facility meets the Commission's methodology for measuring the generating capacity of thermal powerplant. Furthermore, it is unclear how the language from a CPUC resolution discussing the ORNI 18, LLC PPA for North Brawley is relevant to East Brawley, or in any way indicative of any facts regarding East Brawley. Pursuant to the Commission's adopted methodology, leaving aside the issue of the resource limitations discussed

above, the generating capacities of North Brawley and East Brawley are each 49.5 megawatts. Therefore, based on the Commission's methodology, neither North Brawley nor East Brawley is subject to the Commission's jurisdiction. CURE has not used the methodology adopted in the Commission's regulations in asserting that generating capacities of North Brawley and East Brawley trigger the licensing jurisdiction of the Commission.

Moreover, if the contract capacity *were* relevant, it would support the conclusion that neither project is jurisdictional. The contract capacity for North Brawley project was adjusted to 33.178 MW on June 6, 2011. For East Brawley, there is no power purchase agreement and therefore there is no contract capacity. As the contract capacity of North Brawley is under 50 MW and under the Commission's jurisdictional threshold, and there is no contract capacity for East Brawley, neither project is subject to the Commission's jurisdiction.

B. CURE's Complaint fails to make a prima facie case that North Brawley and East Brawley are a single project.

Pursuant to the Warren-Alquist Act, the Commission has exclusive permitting jurisdiction over a thermal powerplant of 50 MW or more, and the powerplant site, which is the location on which the thermal power plant is constructed or is proposed to be constructed.⁹ While the generating capacities of multiple generating machines on a single site being developed simultaneously can be aggregated for the purposes of determining the Commission's jurisdiction,¹⁰ there is no support for CURE's proposition that the generating capacity of facilities located on separate sites and developed years apart may be aggregated for the purposes of determining Commission jurisdiction. As explained in detail below, CURE's reliance on the decision in the LuzSEGS Units III-VII proceeding to assert that the generating capacities of North Brawley and East Brawley should be aggregated is misplaced. The factual scenarios of the LuzSEGS Units III-VII proceeding and the instant proceedings are completely distinguishable.

⁹ Cal. Public Resources Code § 25500, 25119, 25110.

¹⁰ Proposed Order on the Commission's Jurisdiction Over the Proposed U.S. Dataport Generating Facility, 00-JUR-1 (Feb. 7, 2001). Although this proposed decision was ultimately not considered by the Commission, this proposed decision is indicative of the Chief Counsel's guidance on the issue.

1. North Brawley and East Brawley are located on separate sites 1.75 miles apart, and are physically separated by the New River.

CURE's Complaint incorrectly alleges that the two projects "are proposed on adjoining parcels of land."¹¹ North Brawley is located in Imperial County at 4982 Hovley Road, Brawley. East Brawley will be located at 5003 Best Road. These two sites, and the parcels on which they are located, are not adjoining. North Brawley and East Brawley are located 1.75 miles apart, and in completely different locations. Furthermore, the two sites of the two projects are physically separated by the New River. North Brawley is located on the west side of the river, and East Brawley will be located on the east side. This is a sharp contrast to the Luz SEGS Decision cited by CURE, where the Luz SEGS facilities were located on *contiguous* parcels in a common location, separated only by utility and access roads shared by the facilities.¹² Therefore, as North Brawley and East Brawley are located on separate sites, the generating capacities of these two facilities cannot be aggregated.

2. The application for a conditional use permit ("CUP") from Imperial County for the North Brawley was submitted more than a year prior to the submission of the East Brawley's application for a conditional use permit.

Other elements support the fact that North Brawley and East Brawley are separate projects on separate sites that should not be aggregated. North Brawley and East Brawley have been planned and developed separately, which was specifically intended to allow East Brawley to implement a design that improves upon that utilized for North Brawley. For example, as described in the East Brawley CUP application, the improved plant design proposed for East Brawley reduces the amount of water required for the project.¹³ Other design improvements include an improved noncondensable gas treatment system and improved sand separation system.

North Brawley and East Brawley have been permitted separately due to the different timing and stages of development. On June 21, 2007, ORNI 18, LLC and Ormat submitted a CUP application for North Brawley to Imperial County for approval of a geothermal power plant of less than 50 MW, associated facilities, and well field to supply the geothermal fluids.¹⁴ The CUP application for North Brawley was approved on November 14, 2007 by the Imperial

¹¹ CURE Complaint, p. 19.

¹² In the Matter of Staff Investigation of Possible Energy Commission Power Facility Siting Jurisdiction over Five 30 Megawatt Units Known As LuzSEGS Units III-VII, *Resolution Providing Direction to Staff*, p. 1, Appendix I, p. 3 (Oct. 29, 1986) ("LuzSEGS Decision").

¹³ Appendix B, Revised East Brawley Project CUP Application, p. 4.

¹⁴ The CUP application for North Brawley is provided as Appendix C to this Answer.

County Planning Commission.¹⁵ Construction of North Brawley began in December 2007. North Brawley has both an interconnection agreement and transmission service agreement with IID, is currently operating, and has been producing capacity from the facility since 2008. Additionally, the advanced development of North Brawley enabled the project to obtain financing under ARRA.

In contrast, East Brawley is not yet permitted and has no power purchase agreement or transmission interconnection agreement. The CUP application for East Brawley, a geothermal powerplant of less than 50 MW, was filed by ORNI 19, LLC and Ormat with Imperial County on August 8, 2008, more than a year after the CUP application for North Brawley was submitted. This application was ultimately put on hold by Imperial County on October 30, 2008, due to difficulties obtaining a water supply for East Brawley.¹⁶ On January 29, 2010, ORNI 19, LLC submitted a revised project description to Imperial County. The Notice of Preparation for an Environmental Impact Report for East Brawley was posted on June 17, 2010, and the draft EIR for the project issued on March 20, 2011.¹⁷ The final EIR for East Brawley has not yet been issued.

The distinct difference in the development timeline for North Brawley and East Brawley is in marked contrast with the LuzSEGS case cited by CURE. In the LuzSEGS Decision, the CUP applications for the units were submitted simultaneously.¹⁸ Additionally, the LuzSEGS units were identically designed, conceived and developed simultaneously by Luz.¹⁹ Here, the permit applications for North Brawley and East Brawley were filed more than one year apart, and the development schedules for each have diverged even further since then. Based on present information, the minimum difference in the development schedules of the two projects is three years and the maximum is infinite pending future approval of the CUP and certification of an EIR by the Imperial County Board of Supervisors. Given the temporal differences between the development of North Brawley and East Brawley it is clear that these two projects are separate and distinct, and should not be aggregated as a single project. Therefore, CURE's allegation that

¹⁵ Appendix D, Agreement for CUP #07-0017.

¹⁶ Appendix E, County Letter Putting East Brawley CUP Application on Hold.

¹⁷ Appendix F, Notice of Availability of a Draft Environmental Impact Report for Ormat, East Brawley Development Project, ORNI 19, LLC.

¹⁸ LuzSEGS Decision, Appendix I, p. 2.

¹⁹ LuzSEGS Decision, Appendix I, pp. 2-3.

North Brawley and East Brawley constitute a single facility should be disregarded, and CURE's Complaint dismissed.

3. North Brawley and East Brawley will not share utility service.

CURE's Complaint alleges that "North Brawley and East Brawley will also share utility service pursuant to a water supply agreement between Ormat and the City of Brawley."²⁰ This is incorrect. North Brawley receives water from the Imperial Irrigation District ("IID") pursuant to an October 23, 2008 water supply agreement between ORNI 18, LLC and IID. Under this agreement, IID supplies the water required for "use in and incidental to the operation of" North Brawley from IID's Spruce Canal.²¹ No other use of the water is permitted, and there is no provision in this agreement for service to East Brawley.

East Brawley will receive water utility service from IID under an interim water supply agreement until the City of Brawley completes upgrades to its wastewater treatment plant. In its revised CUP application to Imperial County on January 29, 2010, ORNI 19, LLC stated that East Brawley would obtain water from IID, with delivery from IID's Rockwood Canal.²² An alternative water supply for East Brawley was also proposed in the revised CUP application, where the proposed project would obtain treated or recycled wastewater from the City of Brawley's wastewater treatment plant ("BWWTP").²³ This alternative has now been incorporated into the final design for East Brawley. Ormat is in negotiations with the City of Brawley to upgrade the BWWTP to provide tertiary level treatment of outflow as cooling make-up water for the proposed East Brawley Project.²⁴ A memorandum of understanding between Ormat and the City of Brawley, which was submitted on April 8, 2010 and provided as Appendix C to the draft EIR for East Brawley, explicitly states that water obtained from the BWWTP will be used for East Brawley, not for both East Brawley and North Brawley.²⁵ The BWWTP only produces enough water to supply about 2/3 of the need of the proposed East Brawley power plant's needs.²⁶ Unlike the LuzSEGS units, North Brawley and East Brawley will not share water

²⁰ CURE Complaint, p. 20.

²¹ Appendix G, Water Supply Agreement between Ormat and IID, pp. 1, 16; Section 3.1.

²² Appendix B, Revised Project Description for East Brawley Project, p. 13.

²³ Appendix B, Revised Project Description for East Brawley Project, p. 13.

²⁴ Appendix H, Appendix C to the East Brawley Draft EIR, Tertiary Treatment System, Cover Letter, and Project Description, p. 1.

²⁵ Appendix H.

²⁶ CURE Complaint, p. 10. Given that CURE has been an avid participant in Imperial County's environmental review process for East Brawley, and in fact submitted comments on the application for tertiary treatment, it is curious that CURE relies on an outdated conceptual design report for the BWWTP to allege that "[t]reated effluent

utility service, will not share water service facilities, and will in fact obtain water from two different sources. Therefore, aggregation of North Brawley and East Brawley into a single facility is not appropriate.

4. North Brawley and East Brawley are entirely independent of each other, and will have individual facilities.

CURE's assertion that North Brawley and East Brawley will share utility service and infrastructure is incorrect.²⁷ As explained above, the two projects have entirely independent and separately operable equipment, including separate control rooms, substations, interconnection facilities and other equipment. North Brawley and East Brawley have independent and separate project components and equipment, including individual water supply pipelines and equipment, cooling towers, and individual substations.

5. North Brawley does not have a contract option to increase sales to 100 MW.

CURE's Complaint alleges that the North Brawley PPA contains an "option to increase sales up to 100 MW of generation."²⁸ CURE alleges that this is significant because Ormat "intends" to exercise the option to "increase sales to SCE to 100 MW with 50 MW of generation from the proposed East Brawley facility,"²⁹ and thus implies that North Brawley and East Brawley are collectively subject to the Commission's jurisdiction. While the ORNI 18, LLC PPA did contain an option that would allow ORNI 18, LLC to increase the contract capacity by an additional 50 MW of generation, from any additional source, not necessarily East Brawley, ORNI 18, LLC did not exercise that option, and that option has since expired. ORNI 19, LLC, which is not a party to the ORNI 18, LLC PPA, has been conducting PPA negotiations for East Brawley, however, a PPA for East Brawley has not yet been secured.

In summary, North Brawley and East Brawley are entirely separate and distinct projects on separate sites, physically, legally, temporally and financially. Neither depends upon the other in any way whatsoever. There is no basis to conclude that these two projects should constitute a single facility on a single site under the Warren-Alquist Act, as the facts show that these are two separate and distinct projects.

from the BWWTP would also supply the North Brawley facility."

²⁷ CURE Complaint, p. 20.

²⁸ CURE Complaint, p. 15.

²⁹ CURE Complaint, pp. 17-18.

III. AFFIRMATIVE DEFENSES

A. CURE's Complaint is barred by the doctrine of laches.

CURE's Complaint is barred in part by laches. The doctrine of laches precludes a complaint brought after unreasonable delay, where the delay results in prejudice or injury to the respondent.³⁰ Given that North Brawley was approved by Imperial County almost four years ago and is currently operating, and that East Brawley has been in the permitting process for three years, CURE's delay in bringing this complaint is patently unreasonable, and is extremely prejudicial to Ormat, who has invested substantial time, money, and resources in these two projects. Therefore this complaint is barred by laches.

IV. CONCLUSION AND PRAYER FOR RELIEF.

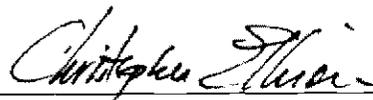
As a matter of law, there is no merit to CURE's claim that either North Brawley or East Brawley has a generating capacity of 50 MW or more under the methodology established by the Commission's regulations. Furthermore, there is no merit to CURE's claim that the North Brawley and East Brawley comprise a single project under the Warren-Alquist Act. CURE has the burden of making a prima facie case and presenting evidence that could support the relief it seeks, and it has failed to meet this burden with respect to both grounds for its complaint.

Ormat requests that the Commission dismiss the complaint with prejudice without further hearing because the complaint is without merit, and fails to assert claims or facts supporting the assertion of Commission jurisdiction pursuant to the Commission's regulations.

Dated: August 29, 2011

Respectfully submitted,

ELLISON, SCHNEIDER & HARRIS L.L.P.

By  _____

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³⁰ Vernon Fire Fighters Assn. v. City of Vernon (1986) 178 Cal. App. 3d 710, 719.

DECLARATION

I, Connie Stechman, declare as follows:

I am the Assistant Secretary for Ormat Nevada, Inc. I have read the attached Verified Answer, and all appendixes thereto, know the contents thereof, and I am informed and believe that the same is true.

I declare, under penalty of perjury under the laws of the State of California, that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 29, 2011

Signed: Connie Stechman
Connie Stechman

At: Reno, Nevada

APPENDIX A
CURE v. Ormat Nevada, Inc.
11-CAI-2

RESPONSES TO MATERIAL ALLEGATIONS IN CURE'S COMPLAINT

1. Respondent denies that it is developing a 150 megawatt geothermal facility in the North Brawley Known Geothermal Resource Area.

2. Respondent denies that the North Brawley Geothermal Development Project and East Brawley Geothermal Development Project are one facility with a combined generating capacity of 150 megawatts ("MW").

3. Respondent denies that the generating capacity of the North Brawley Geothermal Development Project, as defined by the Commission's regulations, is equal to or in excess of 50 megawatts.

4. Respondent denies that the generating capacity of the East Brawley Geothermal Development Project, as defined by the Commission's regulations, is equal to or in excess of 50 megawatts.

5. Respondent denies that it intends to sell 50 megawatts of generation from the East Brawley Geothermal Development Project to SCE under the ORNI 18, LLC PPA.

6. Respondent denies that it has executed a power purchase agreement for the sale of up to 100 megawatts of generation from the North Brawley Geothermal Development Project and the East Brawley Geothermal Development Project.

7. Respondent admits that on June 26, 2007 it filed a conditional use permit application with Imperial County to construct a 49.9 megawatt geothermal power plant located on the west side of the New River called the North Brawley Geothermal Development Project.

8. Respondent admits that on August 8, 2008 it filed a conditional use permit application with Imperial County to construct a 49.9 megawatt geothermal power plant located on the east side of the New River called East Brawley Geothermal Development Project.

9. Respondent denies that Ormat segmented permitting and development of North Brawley and East Brawley for the purpose of environmental review.

APPENDIX B
11-CAI-2

REVISED EAST BRAWLEY CONDITIONAL USE APPLICATION

**EAST BRAWLEY
GEOTHERMAL DEVELOPMENT PROJECT**

UPDATED PROJECT DESCRIPTION

January 29, 2010

Submitted to:

County of Imperial
Planning & Development Services
801 Main Street
El Centro, CA 92243-2811

Submitted by:

ORNI 19, LLC
Ormat Nevada Inc.
6225 Neil Road
Reno, NV 89511

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**EAST BRAWLEY
GEOTHERMAL DEVELOPMENT PROJECT
UPDATED PROJECT DESCRIPTION**

1.0 INTRODUCTION

ORNI 19, LLC, a wholly owned subsidiary of Ormat Nevada Inc. (Ormat), proposes to build the East Brawley Geothermal Development Project in the vicinity of the Brawley 2 Geothermal Exploration Project covered under Conditional Use Permit #07-0029 and the Environmental Impact Report (EIR) for the Geothermal Overlay Zone (g-zone). The project area is north of the City of Brawley in Imperial County, California (see Figure 1).

This Conditional Use Permit application is for the construction of a new 49.9 net megawatt (MW) binary power plant composed of six (6) Ormat Energy Converters (OEC), an expanded geothermal well field beyond the six exploration wells, pipelines to bring the geothermal brine to the power plant, pipelines to take the cooled brine to injection wells, pipelines to distribute noncondensable gases from production wells to power plant area and injection wells, an electric transmission line to interconnect to the substation at the North Brawley 1 Geothermal Power Plant, and a water pipeline to bring water from an Imperial Irrigation District (IID) canal to the power plant for cooling water.

2.0 SUMMARY OF PROPOSED PROJECT

The East Brawley Geothermal Development Project would be located on private agricultural lands just north of the City of Brawley in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, San Bernardino Base and Meridian (SBM). The project is in the g-zone that was covered by the Final EIR dated April 1979 and approved by the Board of Supervisors. It analyzed up to 800 megawatts in the g-zone (see Figure 2). The proposed project is located east of the New River, approximately 1.75 miles east of the North Brawley 1 Geothermal Power Plant along Best Road.

The southern boundary of the project area is just north of the City of Brawley's boundary within their "sphere of influence" and just north of the in-construction Highway 111 bypass in an area zoned M-1 Light Manufacturing. The southwestern boundary of the project is the Del Rio Country Club bounded by the New River. The land to the north and east is agriculture. The eastern boundary of the project is Dietrich Road and to the north Rutherford Road. The majority of the project is along Best Road from Shank to Rutherford Roads. An at-grade intersection will be built at the Highway 111 bypass and Best Road which will provide the best access to the plant site and well field. Well pads may be accessed from the other county roads in the area: Dietrich, Groshen, Rutherford, Ward and Wills. There are also farm and IID canal roads that will be used to access some well locations (see Figure 3).

ORNI 19, LLC/Ormat Nevada Inc. proposes to permit, construct, operate and maintain the East Brawley Geothermal Development Project that would consist of the following facilities:

East Brawley Geothermal Development Project
Updated Project Description

- A 49.9 net MW geothermal power plant consisting of up to six (6) OEC binary generating units (16 MW gross each) with vaporizers, turbines, generators, condensers, preheaters, pumps and piping, motive fluid (isopentane) storage, a motive fluid vapor recovery system (VRU), a gas scrubber, and possibly a regenerative thermal oxidizer (RTO) and related ancillary equipment;
- Two (2) cooling tower batteries with a total of 14-20 cell counter flow, induced draft with drift eliminators of 0.0005 efficiency;
- A control room, office, maintenance shop, parking, and other facilities located at the power plant site;
- Approximately 34 total wells, approximately half for production and half for injection. The final number of wells will be determined by drilling results. Each well will average 4500 feet in depth. Production wells will have a gas separator and corrosion and scale inhibitor and a geothermal fluid booster pump to pump the fluid to the power plant. Each well will also have a sand separator and/or filtration system;
- Piping from production wells to the power plant and from the power plant to the individual injection wells. Gas pipelines will take the gas contained in the brine from the gas separators to either the injection wells or to the gas scrubber at the power plant;
- Blowdown wells (2-4) at the power plant site to provide for injection of the cooling tower blowdown;
- Pumps, tank, valves, controls, flow monitoring and other necessary equipment to the wells and pipelines;
- Maintenance of the production and injection wells cited above;
- Piping, canals or ditches and pumps to bring water from IID's Rockwood Canal to the power plant;
- A pipeline crossing over New River, that would primarily allow connection of geothermal wells located on both sides of the river. This crossing was included in an amendment to the East Brawley CUP application submitted to the County in March 2009, and in Section 5.7 below; and
- A substation with a 2 mile long double circuit 13.8 and 92 kilovolt (kV) transmission line with 66 high poles to interconnect to the IID at the North Brawley 1 substation at Hovley and Andre Roads.

The major components of the proposed East Brawley Development Project, and their function and location are summarized in Table 1.

East Brawley Geothermal Development Project
 Updated Project Description

Table 1: East Brawley Geothermal Development Facilities Summary

East Brawley Geothermal Development Project Facilities Summary			
Facility	Size	Location	Function
Well pads	Up to 34 well pads (including the four existing exploration well pads) would be about 316 feet by 356 feet in size (~2 acres each). A mud sump/containment basin of about 75 feet x 260 feet x 7 feet deep would be located on each well pad.	Identified well pads from the exploration phase would be utilized to the extent feasible. Additional wells would be drilled as needed to provide adequate production fluid and injection capacity at well sites.	Well pads include all the equipment necessary to operate a well. During development, any additional drilling would occur from the well pads. Well pads also include containment basins for drilling and maintenance of the wells
Production Wells	Inside diameter of the production wells would be approximately 30 inches at the top and would telescope with depth. Wells are expected to average about 4,500 feet deep.	Production wells would be located on the well pads at the well sites shown in. Approximately 17 production wells each on separate well pads are projected.	Production wells flow geothermal fluid to the surface that is then transported via above ground pipelines to the power plant to generate electricity.
Injection Wells	Injection wells would be the same size as production wells.	Injection well locations have not yet been designated but would be among the well sites. Up to 3 injection wells could be located on each pad. A total of 17 injection wells each on separate well pads are projected.	Injection wells are used to inject spent geothermal fluid from the power plant back into the geothermal reservoir. Injection ensures the longevity and renewability of the geothermal resource.
Geothermal Production Fluid Pipeline	The pipeline system would vary in insulated diameter from 8 to 30 inches depending on individual well productivity. Up to about 9 miles of production pipeline could be constructed.	The piping system would connect the wells to the power plant. The production fluid pipeline would be located within the pipeline corridors.	Geothermal fluid would be transported from the production wells to the power plant via the geothermal production fluid pipeline.

East Brawley Geothermal Development Project
 Updated Project Description

East Brawley Geothermal Development Project Facilities Summary			
Facility	Size	Location	Function
Injection Fluid Pipeline	The injection piping system would vary in insulated diameter from 8 to 30 inches. Piping would extend from the power plant to the injection wells. Up to about 9 miles of injection pipeline could be constructed.	The injection pipeline would be located among the pipeline routes.	Cooled geothermal fluid would be transported from the power plant to the injection wells via the injection fluid pipeline where it would be injected into the geothermal injection reservoir.
Access Roads	Access roads would be no less than 10 feet wide.	Access roads would extend from existing County roads to the well pads. Existing farm roads would be used to the extent practical. Access roads developed for exploration would be used for any wells and pads that are used for development. Where new pads are created, new access road would be developed.	Access roads are used during development to construct the production wells and install equipment. During utilization, access roads are used for accessing wells for maintenance.
OEC Units	Six, 16 MW (gross) OEC units (manufactured by Ormat Turbines, Ltd.) comprised of vaporizers, turbines, generators, condensers, preheaters, pumps, and piping.	The modular OEC units would be located on the power plant site.	The OEC units are the proprietary modular binary geothermal power generation equipment used on the power plant site.
Motive Fluid Pressure Vessels	The motive fluid would be stored in two, 11,880-gallon pressure vessels.	The motive fluid pressure vessels would be located on the power plant site.	The motive fluid pressure vessels would be used to store isopentane for use in the OEC units.
Vapor Recovery Unit	The vapor recovery unit consists of a diaphragm pump, a vacuum pump, and activated carbon canisters.	The vapor recovery unit is located on the power plant site.	The vapor recovery unit would provide a mechanism to minimize emissions of isopentane from the OEC units during maintenance.
Substation	The substation would occupy a site about 150 feet by 150 feet in size (about 0.5 acres).	The substation would be located adjacent to the power plant.	The substation converts power generated from the plant to the proposed line voltage, 92 kV.

East Brawley Geothermal Development Project
 Updated Project Description

East Brawley Geothermal Development Project Facilities Summary			
Facility	Size	Location	Function
Interconnection Transmission Line	There would be a new two-mile long double circuit 13.8- and 92-kilovolt (kV) interconnection transmission line with 66-foot high poles.	The interconnection transmission line would connect to the IID grid at the North Brawley 1 substation at Hovley and Andre Roads. The new line would span the New River. One proposed route and one alternative route are under consideration.	The interconnection transmission line would transfer the electricity generated by project to the existing power grid for distribution.
Noncondensable Gas Distribution Line	The noncondensable gas distribution line would range from 4-8 inches in diameter. Up to about 4.3 miles of pipe could be constructed.	Noncondensable gas distribution lines would run from well pad separators and power plant site separators to the injection wells.	Noncondensable gases from separators and other equipment would be compressed and injected into the subsurface reservoir.
Regenerative Thermal Oxidizer (RTO) and Caustic Scrubber	The top of the scrubber would be about 30 feet high.	The RTO/scrubber is located adjacent to the power plant.	The RTO/scrubber unit is BACT for the abatement of potential NCG emissions
Cooling Tower	Two cooling tower units (each with seven to ten cells), would be used (manufactured by Cooling Tower Depot, Inc.). The cooling towers would be the largest and most prominent facility on the power plant site (about 54 feet in height).	The cooling towers would be located on the power plant site.	The cooling towers would provide cooling water to condense the motive fluid vapor in the condensers.
Water Conveyance System	The water conveyance system would be a 10 - 24 inch pipeline, about one mile in length, for water coming from IID source. See text for alternatives to IID water.	Water intake from the IID Rockwood Canal Gate 131 would be either underground or put inside of the Livesley Drain that runs between the canal and the power plant site. See text for alternatives to IID water.	The water conveyance system would provide makeup water for the cooling tower at the power plant site.
Blowdown Wells	Two to four cooling water blowdown injection wells would be constructed similar to the geothermal injection wells.	The blowdown injection wells would be located adjacent to the power plant.	The dedicated blowdown wells are used to inject cooling water blowdown to reduce the concentration of dissolved solids in the cooling water.

East Brawley Geothermal Development Project
 Updated Project Description

East Brawley Geothermal Development Project Facilities Summary			
Facility	Size	Location	Function
Power Plant Site and Common Facilities	The power plant would occupy about 15 acres of the 30-acre parcel on which it would be located.	The power plant would be located on private land owned by ORNI 19, LLC.	The power plant site is the physical location where electricity would be generated using modular OEC binary geothermal power plant technology.
Control Room, Office and Maintenance Shop	The footprint of these facilities is depicted on Figure 5.	Each of the facilities would be located on the power plant site.	These habitable structures would be used to control, manage and maintain the project operations.

Construction would commence soon after the CUP is issued. Construction of the power plant would require approximately 15 months. Construction would require up to 200 workers at peak construction. Well drilling, pipeline construction, interconnection transmission line construction, and construction of the power plant would all be concurrent.

3.0 PROJECT LOCATION AND ACCESS

The project area is located within Imperial County, California, about 12 miles southeast of the Salton Sea and 25 miles north of the U.S. border with Mexico (Figure 1). The project is within the North Brawley Geothermal Overlay Zone and the Brawley KGRA, in the Imperial Valley, California (Figure 2). The geothermal overlay zone is a zoning classification developed by the County of Imperial to facilitate development and utilization of geothermal resources in areas of identified geothermal development potential.

The project area is comprised of multiple geothermal leases overlaying privately owned cultivated properties in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, San Bernardino Base and Meridian (SBB&M).

The project is comprised of a power plant and a wellfield; the specific locations of each of these are described below.

3.1 Location and Access of Power Plant

The East Brawley Geothermal Power Plant would be located on private agriculture lands in the southeast corner of Section 15, Township 13 South, Range 14 East, SBB&M identified by Assessor's Parcel Number 037-140-06-01. This is located about one mile north of the City of Brawley. The total property size is 32.81 acres and will not be subdivided. The power plant area will be enclosed by a 6 foot wire fence in an area approximately 900 by 600 feet not including the substation or stormwater retention basin. The house that is currently on the property is vacant and will be demolished as part of project construction activities. A house across the street

East Brawley Geothermal Development Project Updated Project Description

will be vacated and also demolished during construction and prior to the delivery of isopentane to the new plant.

Access to the power plant will be on Best Road just north of Ward Road from a left hand turn pocket built for this project (see traffic study). Best Road will be widened by about 20 feet in this section to accommodate a northbound left turn lane at the entrance point. The necessary tapers are provided, based on 55 mph design, which represents the Prima Facia speed limit, the design speed for the road and Caltrans design criteria. It will be necessary to cover Best Canal along the property frontage to accommodate widening of the road for the turn pocket.

The emergency access will be from Best Road into the south end of the property on the north side of the Livesley Drain. The emergency access road will be constructed with an all-weather surface and lead to a locked gate that can be opened by any emergency responders.

Both of the entrances into the plant site provide excellent access from the new Highway 111 bypass that will include an exit onto Best Road just south of Shank Road. Traffic will come from Interstate 8, north on Highway 111 to Best Road.

3.2 Location and Access of Well Field

The East Brawley geothermal wellfield is laid out in a grid pattern over much of the project area. The power plant site would be centrally located within the wellfield in Section 15. The well field will be located between Rutherford Road on the north, Dietrich Road on the east, the New River on the west, and just north of Shank Road on the south. Access to the wellpads and pipelines will be from Best, Baum (not a county road), Groshen, Kerhsaw, Rutherford, Ward, and Wills Roads. Additionally, farm and IID roads may be used for access. Encroachment permits for ingress/egress and irrigation canal and drain crossings would be obtained from the Imperial County Public Works Department and IID as applicable.

Access to farm land would be coordinated with the landowners to minimize impacts to the farming operations. The wellpads and pipelines will be along the edges of the fields. New access roads would be constructed or improved only as needed to safely accommodate traffic required for wellpad construction, well drilling and well and road maintenance. Road widths to well pads would typically be no less than ten feet wide.

4.0 DESCRIPTION OF POWER PLANT

The proposed power plant can be described as having four interdependent operating systems: (a) the geothermal fluid system; (b) the motive fluid system and fire suppression; (c) the geothermal NCG and RTO/gas scrubber system; and (d) the cooling water system. Each of the OEC units would be able to operate independently but would share common ancillary components such as isopentane storage, geothermal brine supply and injection equipment, cooling towers, substation, etc. Each of the power plant systems are described below.

4.1 Geothermal Fluid System

Geothermal fluid from the geothermal reservoir at about 4,500 feet below the surface would be pumped to the surface from the geothermal production wells. At the surface the geothermal fluid would be transported from the well field via a pipeline system to the power plant site. At the power plant site the produced geothermal fluid would be directed to flow through the six proposed OEC units. The geothermal fluid system is a closed loop system. The geothermal fluids from the production wells would be transported to the power plant site and would flow through the level 1 and level 2 vaporizers and preheaters of each OEC unit, transferring the heat to the isopentane motive fluid through the OEC's shell and tube heat exchangers. The cooled or spent geothermal brine would then be sent to the geothermal brine injection system without coming into contact with the atmosphere.

4.2 Motive Fluid System and Fire Suppression

The OEC is a power generation unit which converts low and medium temperature heat energy into electrical energy. Each OEC unit is an integrated closed cycle vapor turbo-generator system that recycles an organic motive fluid in a fully closed loop with no discharges to the environment. The OEC unit operates in a standard power generation cycle (Rankine cycle) similar to the power generation cycle used in a steam turbine.

The motive fluid selected for the East Brawley Project is isopentane. Isopentane is a flammable, but nontoxic, petroleum hydrocarbon that vaporizes at relatively low temperatures under most atmospheric conditions. The isopentane is circulated through the OEC unit. Heat from the geothermal fluid would be transferred via heat exchangers to vaporize the isopentane in a two-level series of preheaters and vaporizers. The vaporized isopentane would be directed through turbines which rotate generators converting mechanical energy into electricity.

On the backside of the turbine-generators the isopentane vapor would be cooled and condensed back to liquid form in water-cooled condensers. The liquid isopentane would then be returned to a storage tank where it would be cycled back to the OEC units again for reuse. The spent geothermal fluid would be transported on the surface via pipelines to injection wells in the well field where it would be pumped back into the subsurface geothermal reservoir.

The generated electricity would be transformed into line voltage and delivered via an interconnection transmission line to a local utility power grid for distribution. ORNI 19, LLC is negotiating a power purchase agreement (PPA) for sale of the energy generated by the project with a major California utility.

The vaporized isopentane motive fluid from the level 1 and level 2 vaporizers would turn the level 1 and level 2 turbines which together turn a common generator that produces the electricity that is delivered to the substation where it is delivered to the transmission lines. The vaporized isopentane is then condensed in a shell and tube condenser and returned to the preheaters and vaporizers to repeat the cycle. The isopentane motive fluid is therefore also circulated within a closed-loop system, with no significant, routine release or discharge of isopentane.

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The isopentane motive fluid system includes the isopentane side of the OEC Units, two (2) 11,880-gallon isopentane pressure vessels, and an OEC vapor recovery unit (VRU) on each OEC condenser. A vapor recovery unit would be used during major maintenance activities on any of the OEC Units.

Each OEC Unit contains approximately 23,000 gallons of isopentane (in the vaporizers, preheaters, condensers and piping). In each OEC, the motive fluid system is designed as a closed-loop, although there would be minor fugitive leaks from the valves, connections, seals, and tubes. Isopentane from these leaks would be released to the atmosphere or would leak into the geothermal or circulating cooling water lines. Operators would frequently inspect the OEC Units leaks and visual signs of fugitive emissions. Isopentane leak detectors are utilized throughout the facility and continuously monitored.

Any noncondensable gases in the air or water which may leak into the isopentane system would eventually collect in the OEC condenser and reduce the efficiency of the OEC Unit. In order to remove these noncondensable gases, each OEC condenser would have a small (~0.106 scf/hr) OEC VRU. Each OEC VRU would consist of two chambers and a set of isolation valves. Operation of each OEC VRU would be controlled by the power plant computer control system, which would start the OEC VRU noncondensable gas "purge" sequence whenever the efficiency of the OEC Unit fell below a set point. During "purging," nearly all of the isopentane vapors in the OEC VRU would be compressed into liquid isopentane and returned to the OEC Unit, while the noncondensable gases, together with some small quantity of isopentane vapors, are discharged to the atmosphere.

Some major maintenance activities require that at least a portion of an OEC Unit be cleared of isopentane motive fluid liquid and vapors prior to performing the maintenance activities. To control and minimize isopentane emissions during these maintenance activities, the liquid isopentane is drained from the section of the OEC Unit (preheater, vaporizer or condenser) to be maintained or repaired and transferred to another portion of the OEC Unit, the isopentane storage tank, or another OEC Unit. A vacuum pump would then be used to evacuate and compress most of the remaining isopentane vapors, returning the isopentane liquid to the OEC Unit. Those isopentane vapors which do not condense would be released through the isopentane vapor recovery unit, which would adsorb nearly all of the remaining isopentane vapors.

To reduce the risk of fire, isopentane vapor and flame detectors connected to the power plant computer control system are placed at strategic locations around the OEC Units to quickly alert the plant operators to any such hazardous situations. The fire protection system would include an approximately 2,500-gpm diesel firewater pump. Water nozzles/monitors would be placed at the power plant site to be used to minimize the risk of a fire spreading should one start within the power plant. A Risk Management Plan would be prepared for this facility for isopentane.

4.3 Noncondensable Gas and Regenerative Thermal Oxidizer/Gas Scrubber

NCGs are naturally occurring gases in the geothermal fluid that are not easily condensed by cooling. They are predominantly (99.9%) made up of nitrogen, carbon dioxide and methane. The NCG separated from the geothermal production fluid would be compressed and injected back

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into the geothermal reservoir with the spent geothermal fluid. Under very high NCG content in the geothermal production fluid conditions, some of the NCG may be treated in a regenerative thermal oxidizer (RTO) and gas scrubber system to remove air pollutants from the NCG before venting the scrubbed NCG to the atmosphere.

Each of the production wells would deliver geothermal fluid to the power plant through production pipelines. The geothermal fluids would first flow from the production wells through closed, high-pressure well pad separators which would separate most of the geothermal noncondensable gases from the geothermal brine. If the quantity of geothermal noncondensable gases in the geothermal fluid is less than the high end of the possible range, all of these separated geothermal noncondensable gases would flow through other dedicated pipelines to the power plant site, to be dissolved or entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. Small quantities of these separated geothermal noncondensable gases would be discharged to the atmosphere along the dedicated pipelines as condensate, created as the gases cool, is drained from the pipeline.

However, if the quantity of geothermal noncondensable gases in the geothermal fluid is at the high end of the possible range, up to twenty-five percent of these separated geothermal noncondensable gases would flow through other dedicated pipelines to the RTO unit/caustic scrubber system located at the power plant site. The remaining seventy-five percent of the separated geothermal noncondensable gases would flow through the dedicated pipelines to be dissolved or entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. As described above, small quantities of these separated geothermal noncondensable gases would be discharged to the atmosphere along the dedicated pipelines as condensate created as the gases cool is drained from the pipeline.

Up to twenty-five percent of the geothermal noncondensable gases separated at each of the well pads would be delivered through dedicated noncondensable gas pipelines to the RTO unit/caustic scrubber system located at the power plant site. The proposed RTO unit would receive the noncondensable gases from the noncondensable gas pipelines. These gases are expected to contain sufficient hydrocarbons and oxygen (with supplemental air and a small amount of propane) to support complete combustion. Propane would also be used to pre-heat the RTO unit during cold start-ups.

The RTO unit would oxidize the hydrocarbons in the NCGs and supplemental propane to carbon dioxide and water vapor in an exothermic process.

The RTO unit would initially combust, and then abate, at least 97 percent of the benzene, methane and other hydrocarbons in the NCGs it receives. It is considered Best Available Control Technology (BACT) for the abatement of hydrocarbons and volatile organic gases in a wide variety of applications. The RTO unit would also oxidize at least 97 percent of the hydrogen sulfide in the NCGs delivered to the RTO unit. The oxidation of hydrogen sulfide in the RTO unit would produce sulfur dioxide (SO₂) and water vapor. The resulting SO₂ emissions would be controlled by the caustic scrubber.

The low temperature combustion in the RTO unit is flameless and, thus, would not create appreciable nitrogen oxides (NOX) from the oxidation of atmospheric nitrogen.

The proposed caustic scrubber would receive the carbon dioxide, water vapor, sulfur dioxide, nitrogen oxides and other gases produced from the oxidation process in the RTO unit (as well as the gases passing through the RTO unit unoxidized). Before entering the caustic scrubber, the hot gases would be cooled through a direct contact quenching process. The quenched gases would then proceed to the caustic scrubber, where they would be subjected to counter-flows of caustic absorbate (water and sodium hydroxide). The caustic absorbate reacts with the sulfur oxides in the quenched gases to produce sodium sulfates and sulfites, both water-soluble compounds that are dissolved in the caustic scrubber water and piped to a storage sump at the bottom of the scrubber. The remaining gases from the RTO unit are vented out the top of the caustic scrubber through a 30-foot tall stack. The small quantity of spent absorbate would be drained from the storage sump and piped to one of the cooling towers. Fresh absorbate would be added as needed to make up for the loss of exhausted absorbate. The caustic scrubber would remove at least 97.5 percent of the sulfur oxides in the gases it receives. It is considered Best Available Control Technology (BACT) for the control of sulfur dioxide.

A control panel with a programmable logic controller would be used to provide monitoring and control of the RTO unit/caustic scrubber system. RTO unit/caustic scrubber system scheduled maintenance would be coordinated with the maintenance schedule for the East Brawley power plant. The RTO unit/caustic scrubber system would operate at least 95.9 percent of the hours the power plant is operating (equivalent to operating 8,400 hours per year if the power plant operates 8,760 hours per year). When the RTO unit/caustic scrubber system is undergoing unscheduled maintenance or otherwise not operating, the geothermal NCGs would bypass the RTO unit/caustic scrubber system and would be delivered to the cooling towers for release to the atmosphere unabated.

4.4 Cooling Water System

The cooling water system would consist of cooling towers using standard wet cooling tower technology. Cooling water would be used to cool the motive fluid in the condensers and would cycle back to a cooling tower where the water would be cooled, stored and made available for reuse as system process water.

A simplistic diagram of the geothermal system processes minus the NCG and air emission abatement system is schematically represented in Figure 4.

The isopentane vapor condensate is cooled by water circulating from the cooling tower through the condensers. Evaporative cooling in the cooling tower cools the circulating water. A small portion of the circulating water would be injected into the geothermal reservoir via dedicated cooling tower blowdown wells adjacent to the power plant site. The cooling tower blowdown removes the dissolved solids from the water that are concentrated as the water is cycled or reused in the cooling tower.

4.5 Water Conservation and Water Supply

4.5.1 Estimate of Quantity of Make-Up Water

The cooling towers would circulate an average of approximately 195,000 gallons per minute (gpm) total of cooling water to the OEC Units. An average of approximately 2,600 gpm of circulating cooling water would be evaporated from both cooling towers, and both would also blowdown (discharge) an average of approximately 800 gpm. To maintain water balance, the cooling towers would require an average of approximately 3,400 gpm or 5,500 acre-feet per year (total) of cooling tower makeup water.

Binary power plants such as the one proposed are closed loop systems such that geothermal brine produced from the geothermal reservoir is injected in whole back into the geothermal reservoir. Therefore, only a brackish water supply is needed for the cooling system. This is different from a geothermal flash plant where the condensed geothermal steam is used for the cooling water. Flash plants are used on higher temperature geothermal resources than is the case with the East Brawley resource.

Sodium hypochlorite (bleach) would be used for bacterial control in the towers as well as other chemicals for pH control and corrosion inhibition.

4.5.2 Water Saved by Conservation Measures

The estimated amount of water required for the East Brawley power plant is about 5,500 acre-feet. This is 27% proportionally less than that initially requested for Ormat's nearby North Brawley power plant and a 9% further reduction from North Brawley's final design quantity. This is the result of plant design and water optimization changes that were also implemented for the East Brawley power plant, thus a decreased amount than originally stated in the East Brawley CUP application.

The East Brawley Project area occupies approximately 100 acres so the water required for this project equates to about 67 acre-feet/acre. By comparison, farmland consumes about 5.5 acre-feet/acre. However, the project would supply electricity to 50,000 people, or about the entire population of Brawley, and would generate revenue of \$6,500/acre-foot of water compared to \$164/ac-ft for alfalfa based on data from the Summit Blue Consulting, LLC *Renewable Energy Feasibility Study* prepared for Imperial County in 2008.

4.5.3 Water Supply from IID

Ormat plans to obtain its water for cooling tower make-up from the Imperial Irrigation District (IID). Therefore, water losses (via evaporation and blowdown) from the cooling tower would be made up by irrigation water obtained under contract from the IID. Although the Best Canal is closest to the power plant, IID has indicated it does not have the capacity to deliver the water from this canal due to changes in that canal south of the City of Brawley. Makeup water would be obtained from IID Gate 131 on the Rockwood Canal located about one-half mile east of the power plant site. The water from the Rockwood Canal would be gravity fed or pumped in a 10-24 inch pipeline that would be either underground or put within the Livesley Drain that runs east to west between the canal and the power plant (Figure 3).

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The project's water consumption would be met by the IID through their current resources, transfers from other sources or would be offset through water conservation projects identified and approved by IID. Water taken from IID would be subject to the approved Equitable Distribution program during years of water supply demand imbalances. The IID is currently developing an Integrated Water Resources Management Plan to address the water supplies for new non-agricultural projects. In the immediate term the IID has completed an *Interim Water Supply Policy for New Non-Agricultural Projects* (IID 2009) which was recently approved by the IID Board of Directors approval. The IID is expected to execute the pending contract agreement with Ormat for Project water supply upon approval of the interim policy.

4.5.4 Water Supply Alternative: From City of Brawley Wastewater Treatment Plant

As described above, Ormat plans to obtain its water for cooling tower make-up from IID. However, as an alternative and/or supplemental source of water supply, Ormat is currently working with the City of Brawley to obtain treated, or recycled, water from their wastewater treatment plant located immediately west of the power plant site (Figure 2). Ormat and the City of Brawley have entered into a Memorandum of Understanding to facilitate exclusive negotiations for the reclaimed wastewater which includes the construction of a tertiary system to the City's secondary system which is currently being upgraded by the City. The additional agreements include an operations and maintenance (O&M) agreement for operation of the tertiary facility. The City would ultimately own and operate the tertiary facility when it is completed.

This source of water would not be available until 2013 when the tertiary treatment plant would be expected to be completed. Therefore, in the interim period, water from the IID and/or other alternative sources (as described below) would still be needed for the project.

Under this alternative, the City would deliver reclaimed water to the East Brawley Project which is approximately ¼-mile east of the treatment plant adjacent to the New River where it currently discharges treated wastewater under an NPDES permit. The City currently generates approximately 4,400 acre-feet (3.9 mgd) of wastewater per year. As stated above, the estimate of the water requirement for the East Brawley Power Plant would be 5,500 acre-feet per year. Assuming that the effluent from the WWTP will average 4,400 acre-feet a year, ORNI 19, LLP would be capable of utilizing all (100 percent) of the recycled water for cooling water makeup. However, as noted below, an additional source of water would be required during the hot summer months.

As noted, the new tertiary treatment facility is currently scheduled to be operational in early 2013. Thus, water from the Imperial Irrigation District and/or other alternative sources (as described below) would be needed for the project in the interim period. A summary of the conceptual design of the City of Brawley tertiary treatment and delivery system is provided below. The design of this project is currently only in conceptual design phase, so the final design may change somewhat from that described below.

Description of Current WWTP and Planned Expansion

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This treatment plant utilizes a lagoon system to treat 3.9 mgd of domestic sewage (2008 average daily flow). The City of Brawley is currently upgrading the existing WWTP to increase its average daily flow capacity to 5.9 mgd, and to meet more stringent NPDES permit requirements for ammonia removal. Construction of the plant upgrade is expected to begin in early 2010 and be completed by late 2012. Although the upgraded and expanded plant will produce a higher quality secondary effluent, this effluent will not be of the quality required to meet the California Title 22 criteria for direct use of recycled water in open recirculating cooling water systems. Additional tertiary treatment facilities will be required in order to meet these requirements, as well as water quality requirements specific to cooling water system operation.

Water Supply Objectives from Brawley WWTP

Ormat's objective is to meet 100 percent of the make-up water demand for the cooling towers at the proposed East Brawley power plant with reclaimed water. As noted above, engineering estimates are that for a 50 MW plant, the make-up requirement would be up to 5,500 acre-feet per year, which means that Ormat will use 100 percent of the recycled water from the WWTP and will need an additional water supply. Additional water sources are described in Section 4.5.5 below.

Tertiary Treatment Objectives

Tertiary treatment consisting of coagulation, filtration and disinfection will be required to meet or exceed the performance objectives of the California Recycled Water Criteria (Disinfected Tertiary Title 22 Recycled Water; California Code of Regulations (CCR), Title 22) for direct use in open recirculating cooling water systems. This level of treatment will produce effluent that is low in turbidity, BOD, and microorganisms. Title-22 disinfected tertiary recycled water means a filtered and subsequently disinfected wastewater that meets the following criteria from the CDPH Purple Book Update. The requirements for filtered wastewater are at 22 CCR 60301.320, and the disinfection requirements at 22 CCR 60301.230.

Tertiary Treatment Processes

Secondary treatment involves oxidation and clarification, which are already provided by existing plant. In order to provide tertiary treatment, three components are traditionally necessary according to 22 CCR. These processes include flocculation, filtration and disinfection. The tertiary system will be based on either the addition of flocculation tanks and filtration systems, or the use of membrane bioreactors, and upgrading the disinfection process in order to assure meeting the applicable requirements. As stated above, a conceptual plan for the project is currently underway but not yet finalized. Per an internal draft of the conceptual plan, possible treatment methods to be included in the tertiary treatment plant include the following:

- Pretreatment
 - May include some form of phosphate reduction/removal, including chemical precipitation with lime, alum, polyaluminum chloride, or ferric chloride – if phosphate reduction is not low enough from the City's upgraded secondary treatment system. Minimum phosphate levels are required to protect the cooling tower system from corrosion.

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- Solids Processing, which would include pumping coagulated, settled solids/sludge from the sedimentation basins into a 100,000 gallon concrete storage sump, and from there the solids would be pumped to solids processing. The options for solids processing include recycling tertiary solids to WWTP (pumping the solids to the WWTP's activated sludge thickeners, or centrifuges), pumping the solids to the WWTP lagoons, or dewatering the solids with new centrifuges.
- Filtration. The following three alternatives for filtration/removal of suspended organic and inorganic solids from water have been considered:
 - Multi-media (such as use of silica sand, crushed anthracite coal, and garnet or ilmenite, alone or in dual and triple combinations) filters (gravity filters and pressure filters)
 - Cloth disk media filters (use of a cloth membrane as the filter medium)
 - Immersed membrane filters (including use of micro-filtration (MF) and/or ultra-filtration (UF) membranes)
- Disinfection: The tertiary treated water must be disinfected in order to meet the Title 22 criteria for recycled water use within open recirculating cooling water systems. In addition, disinfection of water controls biological activities in the cooling water systems as part of the chemical treatment program. Disinfection options include the following:
 - Ultraviolet light (UV) disinfection (either by using the WWTP's new UV system or a new system)
 - Chlorination disinfection, using either by dissolving chlorine gas in water or by adding hypochlorite salts or solution, all of which lead to the formation of hypochlorous acid (HOCL).

Water Storage

The effluent from the tertiary treatment system will be directed to a storage unit before it is conveyed to the East Brawley plant. Three options are being considered:

- Conversion of the current Lagoon #4 at the WWTP to a storage pond. This pond can store about 5 million gallons of water (currently preferred option)
- Construction of a water storage tank, about 5 million gallons, to be located on the property of the Brawley WWTP
- Construction of a water storage tank, about 5 million gallons, to be located on Ormat's East Brawley power plant property, immediately adjacent to the WWTP

Conveyance/Pipeline

The City of Brawley WWTP is within ½ mile of the East Brawley Power Plant, making conveyance of water relatively simple. The water would be conveyed via a pipeline, approximately 2,000 feet in length from the WWTP to the East Brawley cooling towers. The pipe would be manufactured from HDPE, and would be about 20 inch diameter. It would be buried about three (3) feet below ground, except being deeper below the railroad bed. The pipeline route is shown on Figure 8. The only property other than the City's and Ormat's would be the railroad, of which Ormat would obtain permits to place the pipe under the railroad right of way.

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Need for Additional Water Supply During Summer Heat Conditions

After 2013 when the tertiary treatment system would be complete, Ormat's engineering calculations show that during summer heat conditions, the water from the WWTP may not be enough in itself for cooling tower make-up and additional water may be required from another source. It is estimated that on average the additional amount of water that will be required would be approximately 700 gpm (1,100 acre-ft/yr). The possible sources of additional water are described below.

1. Future Growth of Brawley. With estimated growth rates of the City of Brawley, there should be year-round adequate supply of water from the WWTP in about 10 years. After this, Ormat would not need any additional water source.
2. Water Supply from IID: In the even that Ormat relies entirely on WWTP recycled water, a smaller water contract with the IID will be considered for the secondary water source. This is the primary option until Ormat can obtain enough water from WWTP after further growth of Brawley. As described above, water will be obtained from IID Gate 131 on the Rockwood Canal and piped to the plant. If canal water is used, 1,100 acre-ft a year would be required to supplement the amount from the WWTP.
3. Use of Blowdown Water: Treatment of the cooling tower blowdown water (from both this plant and possibly North Brawley plant) is being investigated so that the water can be reused in the cooling tower instead of injected into the geothermal reservoir.
4. Water from Shallow Groundwater Wells: Using "ground water", as a back-up water source during peak periods. The groundwater would need to be treated, either with reverse osmosis membranes or with a nano-filtration membrane. This is a desirable water source as it is currently not used and unusable for most other applications (the total dissolved solids is too high for use in agriculture), and the only impact we can see brought up as an issue being subsidence, but mitigation measures will be incorporated into the project for this (as described below).

Description of Possible Groundwater System: As a backup water source during peak periods, it is estimated that there would be about two groundwater wells that will be drilled and used to supply this water, with each well will being about 400-700 feet in depth. The wells would be approximately 24 inches in diameter at the top and telescope with depth. Each well pad will be up to 5 x 6 feet (30 ft²). The total production capacity of the wells will be up to about 1,500 gpm if used only as a backup source. In order to pump the water from the wells, on each well a centrifugal vertical production pump will be installed. The water will be pumped through carbon steel pipes to a water desalination system for purification for use in the cooling tower. The system would be based on salt rejection membranes (nanofiltration and reverse osmosis). The water desalination system will be installed in a 40 foot shipping container adjacent to the cooling tower.

The system would be comprised of various components including a sand separator, chemical dosing system (anti-scalant and acid), a series of micron filters and membranes, two booster pumps, and a control system (PLC controlled). The desalination system is

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expected to have 40% to 60% recovery ratio (40%-60% of the feed will be purified and used as cooling water makeup). The water desalination system will have two streams coming out of it: Permeate and Concentrate. The permeate will be used for cooling tower makeup. Because this water will be so clean, it is expected that 5-10 cycles of concentration in the cooling tower will be achieved with this water source. The concentrate will be injected into the geothermal reservoir together with the cooling tower blowdown.

Mitigation Measure Incorporated into Project for Subsidence from Use of Groundwater:

The following measures are incorporated into the project to monitor and mitigate for subsidence:

- Adequate subsidence network benchmarks will be placed around the plant site and tied to the County first order network and will be surveyed annually to detect the occurrence of subsidence. This data will be promptly submitted to the Imperial County Department of Public Works (ICPD). The benchmarks would be installed to conform to County standards. Surveying would be performed to National Geodetic Survey (NGS) standards. The North Brawley 1 project has received approval for the program for the North Brawley Geothermal Overlay Zone which also covers the East Brawley project area.
- Mitigation measures such as increased injection rates, deeper injection wells and/or curtailed production operations are initiated subject to Division approval if a recognizable subsidence bowl forms in the project vicinity, or if unusual aquifer or injection interval pressure changes are observed.

4.5.5 Potential Impacts from Water Usage

Impacts to Water Supply/Utilities/Water Service Systems: Development Design Engineering (DDE) of El Centro prepared a SB610 Water Supply Assessment (WSA) of the proposed project (DDE, 2009). This study was intended for use by the County of Imperial in its evaluation of water supplies for existing and future land uses. The evaluation examined water availability, expected demands of the project, and reasonably foreseeable planned future water demands to be served by IID. DDE, worked extensively over 9 months in close consultation with IID to gather and confirm the accuracy of the data and information presented in the WSA. IID water staff provided significant input to the document and deemed it acceptable before it was submitted to County Planning. A summary of the report is provided below.

The Water Supply Assessment has determined that IID's water supply is sufficient to meet project needs. Water supplies for the Imperial Unit are anticipated to satisfy projected water demands for 20-years given IID's existing agricultural, municipal and industrial uses, water conservation and transfer requirements, rules and regulations, and operational policies. Particular operational policies are the draft Interim Water Supply Policy (IWSP), and the in-process Integrated Water Resources Management Plan (IWRMP).

The WSA stated that water supplies for the Imperial Unit are sufficient to satisfy water demands of IID's current agricultural, municipal and industrial uses, water conservation, and transfer requirements for the term of the QSA. Given IID's rules and regulations, operational policies,

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water supply for new uses in the Imperial Unit are anticipated to satisfy water demands for the 20-year projection of this WSA. In particular, the draft IWSP and the in process IWRMP provide that 25,000 acre-feet will be made available in the near-term and an expected 50,000 acre-feet in the long-term for new municipal, commercial and industrial uses.

The area that would be taken out of agricultural production as a result of the EBGDP is estimated to use 991 acre-feet per year as farmland which uses a consumption rate of 5.25 acre-feet per acre annually. Based on the history of water delivered to the same area by IID from 1998 to 2007, on average the project site has received 912 acre-feet per year. A change in land use from agricultural to industrial for the area that would be taken out of agricultural production as a result of the EBGDP results in an annual consumption of 5,500 acre-feet per year. This is an increase of 455.00 +/- and 503.07 +/- percent when compared to the annual water usage for the area that would be taken out of agricultural production as a result of the EBGDP based on a consumption rate of 5.25 acre-feet per acre per year, and the average of IID's 10-year annual delivery history for the same area respectively.

In addition to the WSA, it is important to point out that the IID has approved and allocated the use of 25,000 acre-feet per year for non-agricultural/industrial uses through its "Interim Water Supply Policy for Non-Agricultural Projects" (dated 9-29-09). The approved 25,000 afy for potential non-agricultural projects within the IID's water service area far exceeds the combined water needs of all of the non-agricultural projects currently proposed. As such, sufficient water resources should be available for each of the projects. Additionally, as described above, Ormat has received a signed MOU with the City of Brawley to construct facilities designed to supply water to this geothermal project.

Impacts to Biological Resources: Prior to the County's preparation of the Initial Study for the East Brawley project, Development Design Engineering (DDE) of El Centro, prepared a study of the impacts of the project to the IID drains and the Salton Sea. DDE's analysis of the impacts to the IID drains and the Salton Sea ecosystem concluded that the impacts would be less than significant. This is supported by the information we present below and by the simple inference that because DDE's evaluation clearly concluded that the proposed project would have a negligible or less-than-significant impact to the water supply to the Salton Sea, it can be inferred or implied that the impacts to biological resources as a result of this insignificant reduction in water would also be insignificant.

Potential Impact to IID Drains & Salton Sea: Development, Design & Engineering (DDE) prepared an evaluation of the impacts of the proposed project to IID Drains & Salton Sea, dated December 3, 2009. As summarized in this report, the proposed water use for the facility is 5,500 acre-feet / year. This is the approximate amount of water needed to irrigate 1,048 +/- acres of agricultural land in Imperial Valley based on the assumption that an average acre of agricultural land uses 5.25 acre-feet per year, which is the 2009 apportionment for water users that have eligible farmable cropland. After analyzing the impacts of the project to IID drains and the Salton Sea, DDE determined that any potential impacts are negligible, or less than significant, for the following reasons:

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- The agricultural equivalent of land that correlates with ORMAT'S proposed water use equates to approximately 0.23% of IID's irrigated acreage, an insignificant amount.
- Approximately 13% of the total irrigated acreage within the Imperial Unit is irrigated at least twice, which conveys additional water to IID drains and the Salton Sea. When compared to this additional drainage water, the proposed project's reduction to drainage water is insignificant.
- Assuming the total average irrigated acreage of the Imperial Unit uses 5.25 acre-feet per acre per year; ORMAT proposes to use approximately 0.2% of all water used for agriculture in the Imperial Unit, an insignificant amount.
- The proposed project's reduction in drainage water is approximately 0.12% of the total outflow of the Salton Sea through evaporation, an insignificant amount.
- The proposed project's loss of drainage water is approximately 0.2% of the amount of drainage water generated from Imperial Unit's total average irrigated area, an insignificant amount.

Cumulative Impacts from Use of Water: In response to the report described above, IID inquired about an assessment of cumulative impacts considering other industrial facilities whose water use (or potential water use) would reduce the inflow conveyed to IID drains and subsequently, the Salton Sea. Following is a cumulative impact analysis on inflow to IID Drains and the Salton Sea, prepared in concert between Ormat, DDE, and Barrett's Biological Services.

The geothermal projects for which water applications have been submitted to IID and/or where CUP applications have been submitted to Imperial County for new industrial projects total approximately 8700 ac-ft. These include:

- East Brawley at 5500 ac-ft,
- Approximately 800 ac-ft for CHAR's Hudson Ranch I project, and
- Approximately 2400 ac-ft for CalEnergy's Black Rock projects at 800 ac-ft each.

This total combined amount of water from these projects is approximately 1/3 of the 25,000 ac-ft allocated by IID for industrial use under the IWSP for non-agriculture projects. Using the same calculations as those previously done for East Brawley, 8700 ac-ft calculates to 2523 ac-ft less to the drains ($8700 * 29\%$ (% of water to tile/drains) which is less than 0.2% of the water evaporated from the Salton Sea. Thus, this cumulative loss of water to the drains and ultimately from proposed projects is also insignificant. Additionally, no one drain will be impacted more than another. As a side note, rather than an adverse cumulative impact, there is actually a positive cumulative impact from these projects, in that this water reduces the amount of salt going to the sea by 8,700 tons.

The approved 25,000 ac-ft for potential non-agricultural projects within the IID's water service area far exceeds the combined water needs of all of the non-agricultural projects currently proposed. As such, sufficient water resources should be available for each of the projects.

Which Drains will be Impacted by Reduction of Water: In the same response to DDE's December 3 report, IID stated that "the project proponent did not address which drains will be impacted by the facility (there may be direct impacts to the drains discharging to the Salton Sea

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and that may have pupfish present). Also the assessment lacked proper location of facility; making it difficult to evaluate any other wildlife species issues, such as Yuma Clapper Rail." Following is information to respond to this comment, again, prepared in concert between Ormat, DDE, and Barrett's Biological Services.

There are no drains near the proposed East Brawley power plant site that drain directly to the Salton Sea. Biological surveys completed in the area for the East Brawley project found no pup fish or Yuma Clapper Rail habitat. The project site is only 32.75 acres which will equal $(32.75 \times 5.25 = 172 \text{ ac-ft} \times 29\%)$ 50 ac-ft of water less to the Livesley Drain which is adjacent to the property. The 5500 ac-ft needed for this project and the loss of 1595 ac-ft to the drains that results would not come from that specific area but generically from the entire IID system. Taking "away" 5500 acre-feet of water from agriculture, which is what is implied, would be spread across the IID's district, not in the project area. Thus, $5500 \text{ ac-ft} \times 29\% = 1595 \text{ ac-ft}$ less to drains across the county. If the same assumption is used for 8700 ac-ft, $(8700 \text{ ac-ft}/2,730,000)$, 0.32% less water goes to the drains from these proposed industrial projects. This is an insignificant cumulative loss which also would not affect vegetation and/or wildlife found in the drains and/or the Salton Sea.

Review of IID's draft Integrated Water Resources Management Plan (IWRMP aka IRP) and Interim Water Supply Policy (IWSP) for Non-Agricultural Projects. Ormat has reviewed the IWRMP, participated in IID meetings and submitted extensive comments. The document contains much incorrect data about existing geothermal projects in the valley in addition to cooling technologies that are not viable in this meteorological environment. We have submitted similar comments to the California Energy Commission. The use of geothermal steam condensate for cooling water, which is source of water for flash plants, causes depletion of the geothermal resource, subsidence, and release of the noncondensable gases from the geothermal fluid and produces geothermal scales that may be hazardous. Whereas, the Ormat binary process which requires "raw" water eliminates these negative environmental impacts. This is viewed as that the Ormat binary process is a much cleaner and environmentally sound method over steam and flash type plants, and certainly an environmental improvement over coal and gas power plants.

Review and Compliance with the IID Water Conservation and Transfer Project Draft Habitat Conservation Plan (HCP): Ormat and its team of consultants reviewed these documents. As shown in the calculations above, the proposed amount of water is insignificant to biological resources and, thus, will not impact either individually or cumulatively the requirements of the IID Water Conservation and Transfer Project draft HCP. In addition, pending the City of Brawley's completion of upgrades to the treatment plant currently scheduled for 2012, tertiary treated water is planned to replace IID's pending water contract. Therefore, this is a temporary use of canal water from IID, about 2-5 years.

5.0 DESCRIPTION OF WELLFIELD, DRILLING, TESTING, PRODUCTION, INJECTION

5.1 Geothermal Wellfield (Revised)

The Brawley geothermal wellfield is laid out in a grid pattern over cultivated fields in the project area. The grid pattern is generally aligned along field roads located adjacent to existing irrigation channels or drains.

A description of the revised/updated well field was included in an amendment to the East Brawley CUP application submitted to the County in March 2009. This information is provided below. A copy of the latest wellfield map is provided in Figure 3.

The well field was revised in March 2009 to reflect addition land that has been leased and the results of the exploration well drilling to date. The total well count has also dropped from 60 to about 34. It will still be split about equal between production and injection wells. The New River pipeline crossing is also reflected on the revised map. The amount of pipeline in the well field will be reduced as a result of less wells and a consolidated well field. Several of the well pads on the south end of the field will be best accessed from Shank Road.

Ormat has obtained an easement from the Imperial Irrigation District (IID) for the transmission line routing along Ward Road to the west of the proposed plant location. They own parcel number 037-160-51-01, a 5.78 acre parcel between the railroad and the Veysey parcel.

Ormat was selected by the City of Brawley to negotiate exclusively for the water from their Waste Water Treatment Plant. Ormat proposes to build the upgrades needed to bring the facility to tertiary treatment and then give the facility to the City and pay for the water via an operations and maintenance agreement. The City will be the CEQA lead agency for this project. The treatment plant will generate enough water for the East Brawley power plant such that canal water from the IID will only need to be a backup once the facility is built. Ormat is requesting that the County and the City work together under a Memorandum of Understanding to prepare a single CEQA document that satisfies both the City and the County because the issues brought up in the EEC hearing would be the same – impacts to water and ecosystems of the IID drains and Salton Sea.

This realignment of the well field will have less impact than the project as originally proposed as it is smaller. Biological and cultural resource surveys will be performed to duplicate those already completed on the other areas of the project.

Access to the well pads and pipelines would be from Andre, Best, Baum (not a County road), Groshen, Kershaw, Rutherford, Ward, and Wills Roads. Additionally, farm roads and IID roads (with permission) may be used for access. Encroachment permits for ingress/egress and irrigation canal and drain crossings would be obtained from the Imperial County Public Works Department and IID as applicable. With the exception of two well sites (14-15 and 15-15), all of the proposed well sites are located east of the New River. Access to farmland would be

coordinated with the landowners to minimize impacts to the farming operations. The well pads and pipelines would be along the edges of the fields. New access roads would be constructed or improved only as needed to safely accommodate traffic required for well pad construction, well drilling, and well and road maintenance. Road widths to well pads would typically be no less than ten feet wide.

5.2 Well Drilling

Geothermal well drilling would be conducted from constructed well pads approximately 316 feet by 356 feet (about 2 acres). A well pad sump/containment basin (nominally 75 feet x 260 feet x 7 feet deep) would be constructed on each well pad to contain drilling mud and rock cuttings from the drilling operations (Figure 6). A Stormwater Pollution Prevention Plan (SWPPP) has been prepared for the geothermal well field and is amended for the construction of each new well pad to prevent stormwater discharges from the well pads during site construction.

Standard geothermal well drilling equipment and well drilling operations would be implemented for the project. The wells would be drilled using a large rotary drilling rig whose diesel engines are permitted under the California Air Resources Board (CARB) Portable Engine Registration Program (PERP). The wells would be drilled with water-based mud to circulate the drill cuttings to the surface. During drilling, the top of the drill rig derrick would be as much as 175 feet above the ground surface, and the rig floor could be 20 to 30 feet above the ground surface. The typical drill rig and associated support equipment (rig floor and stands; draw works; derrick; drill pipe; trailers; mud, fuel and water tanks; diesel generators; air compressors; etc.) would be brought to the prepared site on approximately 40 or more large tractor-trailer trucks. The placement of this equipment within each prepared site would depend on rig-specific requirements and site-specific conditions.

The well bore would be drilled using non-toxic, temperature stable gel-based drilling mud or gel and polymer drilling fluid to circulate the rock cuttings to the surface where they are removed from the drilling mud. The mud is then recirculated. Rock cuttings would be captured in the containment basin. Additives would be added to the drilling mud as needed to prevent corrosion, increase mud weight, and prevent mud loss. The inside diameter of the wells would be approximately 30 inches at the top and would telescope with depth. The typical design depth of both the production and injection wells is projected to be about 4,500 feet. Each geothermal well would be drilled and cased to the design depth or the depth selected by the project geologist. The final determination of well depth and well completion would be based on geological and reservoir information obtained as wells are drilled.

The California Division of Oil, Gas and Geothermal Resources (CDOGGR) regulates geothermal well drilling operations on private lands in California. CDOGGR approves the drilling program for each well including the blow out prevention equipment (BOPE) to ensure the drilling operations are safe, protect the community, and protect land and water resources. Drilling operations would take place for 24 hours per day, 7 days per week. Each geothermal well would take approximately 30 days to complete.

5.3 Well Testing

Wells would be tested while the drill rig is still over the well. The residual drilling mud and cuttings would be flowed from the well bore and discharged into the drilling sump. This cleanout flow test may be followed by one or more short-term flow tests, each lasting from several hours to a day and also conducted while the drill rig is over the well. These tests typically consist of producing the geothermal well into portable steel tanks brought onto the well site while monitoring geothermal fluid temperatures, pressures, flow rates, chemistry and other parameters. Steam from the geothermal fluid would be allowed to discharge to the atmosphere. Produced fluid from the short-term flow test would be pumped back into the well.

An injectivity test could also be conducted by injecting the produced geothermal fluid from the steel tanks back into the well and the geothermal reservoir. The drill rig would likely be moved from the well site following completion of these short-term test(s). Following the short-term test, all equipment would be removed and the well shut in. Temperature profiles of the wellbore would be measured during the shut in period.

After the rig has moved, a longer-term test could be conducted using a test facility consisting of approximately ten, 21,000-gallon steel tanks, injection pumps, coil tubing, nitrogen pumps, filtration units, flow meters, recorders, and sampling apparatus. This test could last for 30 days. Steam from the geothermal fluid would typically be allowed to discharge to the atmosphere. The remaining water would be injected back into either the well from which it was produced or into a second well via temporary pipeline routed along the well site access roads.

Following completion of the short-term geothermal well testing, all of the drilling and testing equipment would be removed from the site. The surface facilities remaining on the site would typically consist of several valves on top of the surface casing, which would be chained and locked and surrounded by an approximately 12-foot by 12-foot by 6-foot high fence to prevent unauthorized access and vandalism.

5.4 Production and Injection Wells

Geothermal resources required to supply the power plant would be supplied from the production wells surrounding the power plant location. Geothermal fluid injection wells would be required to inject the geothermal fluid produced for the project back into the geothermal reservoir. The production and injection wells would be drilled from selected well sites. More than one injection well may be placed on an injection well pad to reduce the use of farmland for the project.

As geothermal production and injection wells age they typically produce less and/or cooler geothermal fluid, or inject less fluid, and may need to be redrilled or worked over. Redrilling or reworking a well requires many of the same activities required to drill a new well. These activities would occur periodically over the life of the project. Any of the geothermal production wells which do not demonstrate sufficient commercial productivity may be converted to an injection well. Any of the wells could also be converted to a monitoring well, or could be abandoned in conformance with the requirements of the CDOGGR.

Dedicated cooling tower blowdown wells (2-4) would be drilled in the same way as an injection well. The only difference is the fluids they take for injection is the water from the cooling tower which is not geothermal brine. These wells would be located adjacent to the power plant.

5.5 Well Site Production and Injection Equipment

Each new production well would be equipped with a pump driven by an electric motor located on top of the well pump discharge head. A small, truck-mounted well maintenance rig would install these pumps in the wells. Other small trucks and vehicles would be involved in installing the pump, which is normally conducted only during daylight hours. An electric cable installed along the pipeline from the power plant would provide the electricity to power the well pump motor. Mineral oil is pumped down from the surface at the rate of one to three gallons per day to lubricate the downhole pump lineshaft bearings. This lineshaft bearing lubrication water or mineral oil would be discharged into the produced geothermal fluid and eventually injected into the geothermal fluid injection reservoir. The mineral oil is less than 2 ppm of the volume injected. Production wells would have corrosion and scale inhibitor located on the well pad with secondary containment.

Production wellhead dimensions are not expected to exceed a height of fifteen feet above the ground surface or four feet in diameter. An approximately 8-foot by 15-foot, 10-foot high motor control building may be located within approximately 50 feet of each production well. It would house and protect the auxiliary well systems, motor switchgear controls and sensors, and transmitters for temperature, pressure, and flow rate data. The wellhead, pump motor and motor control building would each be painted an earth tone color to blend with the area and minimize visibility. A gas separator would also be located on each well pad used for production wells. They are 6 feet in diameter, 20 feet long and stand 18 feet tall. Up to about twenty-five percent of the geothermal noncondensable gases separated at each of the well pads may be delivered through dedicated noncondensable gas pipelines to the geothermal noncondensable gas scrubbing system located at the power plant site as described previously.

Each well pad would also include a sand separator for removing sand from the geothermal fluid and a booster pump to increase geothermal fluid pressure. Neither wellhead pumps nor the auxiliary equipment or motor control buildings are required at the injection well sites. Instead, injection pumps located at the power plant site would pump the geothermal injection fluid through the injection pipeline system, providing sufficient pressure to inject the cooled geothermal fluid back into the geothermal reservoir. More than one injection well may be located on an injection wellpad. It is likely that some sort of sand separator and/or filtration system will be located at the injection well pads (in addition to production well pads).

5.6 Geothermal Pipeline Systems

Above ground pipelines will be constructed to deliver the produced hot geothermal fluid from the production wells to the power plant site (aka geothermal production fluid pipelines). Similarly, above ground pipelines will be constructed to return the cooled or spent geothermal fluid from the power plant site to injection wells for subsurface injection of the fluid back into the geothermal reservoir (aka geothermal injection fluid pipelines). The proposed interconnecting production and injection fluid pipeline routes are shown on Figure 3.

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Each of the production wells would deliver geothermal fluid to the power plant through new pipelines routed in corridors adjacent to existing farm roads or parallel to, but outside of the rights-of-way of County roads. The total length of new pipeline would depend on which of the production wells were connected to the power plant. Ormat either has geothermal leases with the landowners where the pipelines would be located or would work with the landowners to obtain easements for the placement of the pipelines to minimize impact to farming operations and to stay outside of Imperial County rights-of-way, not only existing but for future expansion.

Similarly, the injection fluid pipelines to the injection wells would be routed in corridors adjacent to existing farm roads or parallel to, but outside of the rights-of-way of County roads. In some sections, the injection pipeline would also parallel the new production pipeline. Here the injection pipeline would either be placed adjacent to, or atop ("piggyback") the production pipeline. The total length of new injection pipeline would also depend on which of the injection wells were connected to the power plants.

The total length of new pipeline would depend on which of the wells were connected to the power plant. If all of the approximately 35 wells were connected, then approximately 9 miles of new production fluid pipeline would be constructed.

The production and injection pipelines would be constructed from steel pipe designed, constructed, tested and inspected pursuant to current industry standards for high temperature, high pressure piping. The diameter of the steel pipe would vary depending on the type and amount of geothermal fluid to be conveyed. Once covered with about two inches of insulation (one inch for injection pipelines) and a protective metal sheet (appropriately colored to blend with the area), the overall outside diameter of the finished pipe would range from 8 to 36 inches. The pipelines would be constructed near ground level (averaging about one foot off the ground) on pipeline supports installed approximately every 20 to 40 feet along the pipeline routes.

"Expansion loops" would be constructed about every 250 to 500 feet along the production pipeline route so that the pipeline could "flex" as it lengthens and shortens due to heating and cooling. These square bends in the pipeline are typically horizontal, approximately 40 feet in length by 40 feet in width. Some expansion loops are vertical, although these are typically smaller, 15 to 20 feet high. Electrical power and control cables for the production well pump motors and valves, and production and injection wellhead instrumentation would be installed in steel conduit constructed on the pipe supports, buried in a trench dug next to the pipelines or provided by an aboveground electrical distribution line. Injection pipelines have fewer expansion loops.

Some new access roads would be built for pipeline construction or maintenance. Pipeline construction would not require significant grading of the pipeline route. The pipeline would be constructed to cross beneath existing roads to allow continued access. Pipeline crossings of any unpaved roads (including Ward) would typically be constructed by the cut-and-fill method, which minimizes the time during which traffic on the road would be impacted. A trench would be cut through the road and a prefabricated U-shaped section of insulated, wrapped geothermal

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fluid pipe, placed inside a larger diameter pipe or otherwise protected so that it is strong enough to support traffic on the road above, would be placed in the trench. The excavated dirt would then be backfilled and compacted around and above the pipeline or pipe sleeve, and the roadbed material would be repaired or replaced. Access would typically be restricted for only a few hours during actual construction. Appropriate traffic controls (including detour signs) would be in place during any construction within the roadbed or adjacent shoulders of each road to warn and control traffic.

For the crossing of Best Road, the pipeline and accompanying power and control cables would be installed by cut and fill technique or with microtunneling procedures. The latter technique does not disrupt traffic and neither technique would cause settlement of the roadbed. Microtunneling would be conducted by specialty contractors using specialized equipment. Oversize steel casing would be installed behind a boring machine that would be advanced under the road by "jacking." Pits would first be excavated and braced at each end of the casing run. The boring machine and casing sections would then be lowered into one pit. The boring machine (with casing behind it) would be "jacked" under the road using specially designed jacks. Casing sections would be welded together as they are moved forward to form a continuous casing under the road. Once the welded casing is in place under the entire road the boring machine would be removed through the other pit. Cement grout under pressure would be used to fill any voids between the casing and the dirt under the road.

The pipeline crossing of the New River would interconnect facilities on the east and west sides of the river. The crossing is discussed in further detail in Section 5.7 below.

Pipeline crossings of the Imperial Irrigation District (IID) canals or drains would be above ground or underground at their request. All River and IID canal and drain crossings would be engineered and constructed in conformance with the applicable IID encroachment permit requirements. Field drains and head ditches would be crossed by the pipelines as agreed to with the individual landowner/geothermal lessor.

Pipeline construction would be conducted concurrent with the construction of the power plant.

5.7 New River Pipeline Crossing

A description of this project was included in an amendment to the East Brawley CUP application submitted to the County in March 2009. This information is provided below. See the March 2009 submittal for draft figures and drawings; however, the plans have been revised/refined somewhat and the latest preliminary draft plans are available from Ormat.

This project involves the installation of piping over the New River north of the City of Brawley, east of Highway 111 and Andre Road and just south of the City of Brawley's Wastewater Treatment Plant (See attached figure). It will be located on private land (APN 037-140-02-01) owned by Veysey, Victor V. & Janet D and under lease to ORNI 17, LLC in the southeast corner of Tract 118 (see map). Several pipes from geothermal pads on the east side of New River will be extended across the New River (WGS 84 33°1'01.4"/115°31'12.1"). The pipes will allow connection of geothermal wells located on both sides of the river. The pipe crossing at the river

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will be approximately 18 feet wide and begins at the end of a private road on each side of the river.

The crossing will support the following equipment:

- 2 x 24 inch geothermal brine lines
- 2 x 12 inch noncondensable gas lines (mostly carbon dioxide)
- 1 x 16 inch pipe for canal water for cooling tower make up
- 1 x 12 inch pipe for cooling tower blow down water (possibly from North Brawley to East Brawley)
- A 36 inch cable tray for power and control cables
- A man walkway for maintenance and inspection

The crossing would be a truss structure spanning the river. The footings to support the structure and pipes will be approximately 15-20 foot square on each side of New River. A total of two footings will be placed approximately 10 feet east and west of the bank of New River. The footings are located in an area of sparse vegetation consisting of salt cedar (*Tamarix sp.*). The area necessary for construction activities will be approximately 100 feet and will be located east and west of the bank of New River.

The pipes will be constructed of industrial standard designation of "extra heavy" wall thickness. An automatic injection pump shut-off and check-valve system will immediately stop fluid flow should a leak or break occur in any of the pipes. A system of pressure and flow sensing devices, capable of detecting any leak or spill, would be installed and maintained. Additionally, the pipelines would be inspected on a regular basis. The crossing and pipelines will be designed, engineered, manufactured and assembled to perform and comply with all the relevant county, state and federal regulations such as California Building Code, ASME and OSHA.

The pipe will be positioned through the use of cranes located east and west of the bank of New River. Other construction equipment will include a forklift, water truck, backhoe and loader. The area on each side of the river where the crossing will be anchored is flat and will require minimal grading. No grading permit is anticipated to be required based on the amount of dirt to be moved. The anchors will be away from the river bed. Erosion control measures will be implemented if the final design indicates that protection of the river is needed from potential erosion or run-off during construction. Construction time will be brief; approximately five to six weeks.

Locked gates will be located over the pipelines on each end of the crossing to prevent public access. There will be a walk way area to allow workers to inspect the pipelines, there is no vehicle access. The gates will signed "private property" and "no trespassing" in both English and Spanish.

Potential impacts to biological resources, cultural resources, and other issues were discussed in the March 2009 submittal with a conclusion of no significant impact from the New River Bridge Crossing.

6.0 TRANSMISSION AND INTERCONNECT

ORNI 19, LLC is negotiating a power purchase agreement (PPA) for sale of the energy generated by the project with Southern California Edison (SCE). If these negotiations falter, the project would not stop as ORNI 19 LLC could either contract with other utilities or energy companies or could use an option under the existing North Brawley Geothermal Project PPA with SCE which allows them to sell up to 100 MWs.

A substation would be located on the west side of the power plant site. A new transmission line would interconnect to the IID at the North Brawley 1 substation located near the intersection of Hovley and Andre Roads. The interconnection line would be a 2- to 5-mile long double circuit 13.8- and 92-kilovolt (kV) transmission line with 66-foot high poles. The transmission line pole and turning structure designs have not yet been completed, but the distance between the conductors and the ground wire near the top of poles will exceed 60 inches to prevent the potential electrocution birds that may perch on the poles. Both the new substation and the interconnection transmission line would be part of the East Brawley Project. The new line would span the New River, but no structures would be constructed within the River. Encroachment permits and easements would be obtained from the landowner or agencies as required for permitting and installation of the interconnection transmission line.

The proposed interconnection transmission line route and one alternative route are under consideration as shown in Figure 7. The proposed interconnection line would be routed to the west from the power plant substation, crossing the New River and would be aligned north of Andre Road to the interconnection point at the North Brawley 1 substation (west route). The alternative interconnection transmission line route would course northerly to an alignment on the south side of Baum/West Baughman Road turning west and crossing the New River to Hovley Road where it would turn to the south to the North Brawley 1 substation interconnection point (north route). The substation and interconnection transmission line construction would be conducted concurrent with the construction of the power plant.

The substation at North Brawley is the point of demarcation between Ormat and the IID. The substation is owned by ORNI 18, LLC. The transmission lines beyond the substation are owned and operated by IID to a point of interconnection with California Independent System Operator's (CAISO) controlled grid.

7.0 ABANDONMENT AND SITE RESTORATION

The projected life of the Project is a nominal 30 years. At the end of the useful life of the Project, equipment and facilities would be properly abandoned. The geothermal wells would be abandoned in conformance with the well abandonment requirements of the CDOGGR. Abandonment of a geothermal well involves plugging the well bore with clean drilling mud and cement sufficient to ensure that fluids would not move across into different aquifers. The wellhead (and any other equipment) would be removed, the casing cut off at least six feet below ground surface, and the well site reclaimed.

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At the end of power plant operations, the project would prepare and implement a Site Abandonment Plan in conformance with Imperial County and CDOGGR requirements. The Plan would describe the proposed equipment dismantling and site restoration program in conformance with the wishes of the respective landowners/lessors and requirements in effect at the time of abandonment. Typically, above-ground equipment would be dismantled and removed from the site. Some below ground facilities may be abandoned in place. The surface of the site would then be restored to conform to approximate pre-project land uses.

8.0 ALTERNATIVES CONSIDERED BUT ELIMINATED

An alternative project location for the project was considered, but it was determined that the proposed project was specific to Ormat's geothermal leases in East Brawley. A geothermal project must be sited near the commercial geothermal resource it is utilizing because the geothermal resource cannot be transported long distances without losing its heat and viability as an exploitable energy source. Ormat acquired the proposed power plant location because of its location with respect to the geothermal resource and the availability for purchase. As such, an alternative project location was eliminated from further consideration.

9.0 ENVIRONMENTAL PROTECTION MEASURES

Measures intended to mitigate potential impacts from occurring as a result of the Project construction and operations were listed in the CUP application and applicant's provided Environmental Assessment.

10.0 LIST OF OTHER STUDIES PERFORMED FOR PROJECT

Barrett's Biological Surveys. 2008. *Ormat East Brawley Plant, Preconstruction Survey, Imperial County*. (May 2008). Prepared for Ormat Nevada, Inc.

Barrett's Biological Surveys. 2007. *Biological Technical Report, Ormat Geothermal Plant Site, North Brawley, California*. (May 15, 2007). Prepared for Ormat Nevada, Inc.

Darnell & Associates, 2009. *Traffic Study for East Brawley Geothermal Development Project*. December 1, 2009 (revised)

Development Design & Engineering. 2009. *East Brawley Geothermal Development Project, SB 610 – Water Supply Assessment – FINAL*. (August 11, 2009). Prepared for Ormat Nevada Inc.

Development, Design & Engineering, 2009. *Environmental Assessment of ORMAT's East Brawley Geothermal Development Project's Potential Impact to IID Drains & Salton Sea*. December 3, 2009

Environmental Management Associates, 2008. *Application for Authority to Construct ORNI 19, LLC – Ormat Nevada, Inc., East Brawley Geothermal Development Project*. October.

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Tierra Environmental Services. 2008. *A Cultural Resources Survey of 189-Acres Proposed for Geothermal Development near Brawley, Riverside [sic] County, California*. (November 2008).

Tierra Environmental Services. 2009. Letter Report: *Additional Cultural Resources Survey for the East Brawley Geothermal Project*. (March 17, 2009).

FIGURES

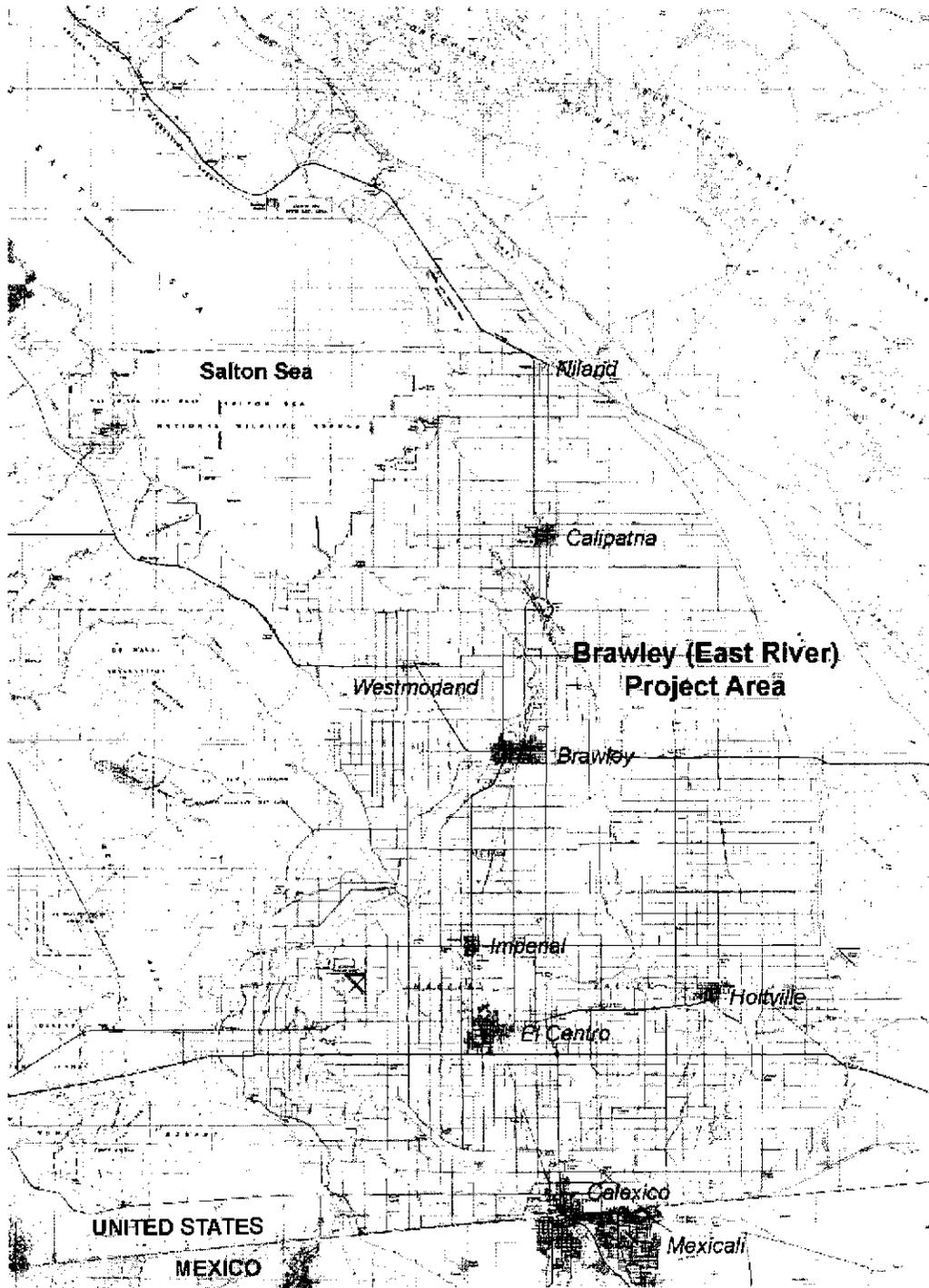


Figure 1: Location Map – Brawley East River Geothermal Development Project

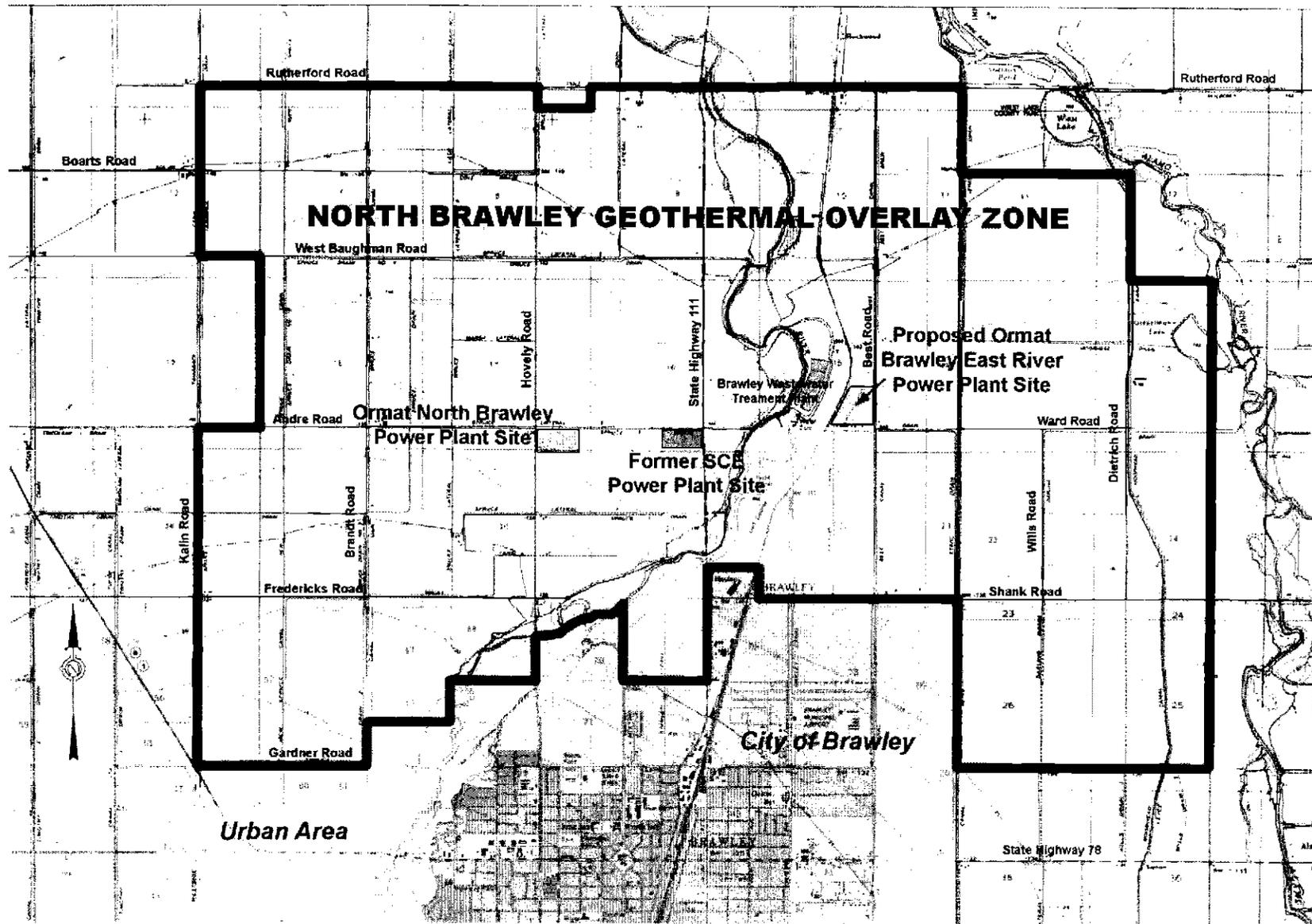


Figure 2: North Brawley Geothermal Overlay Zone Map Geothermal Wellfield – Brawley East River Development Project



- Proposed Geothermal Development Well Site: ●
- Approved Geothermal Exploration Well Site: ●
- Proposed Geothermal Pipeline Route: L-shaped line
- Proposed Freshwater Pipeline Route: —
- Proposed New River Crossing: I

Project Area Extents
Shown on the Figure:



TN ^ MN
12°

0 0.5 1.0
Miles

Figure 3: Geothermal Wellfield – East Brawley Development Project

ORMAT Water Cooled Binary Geothermal Power Plant

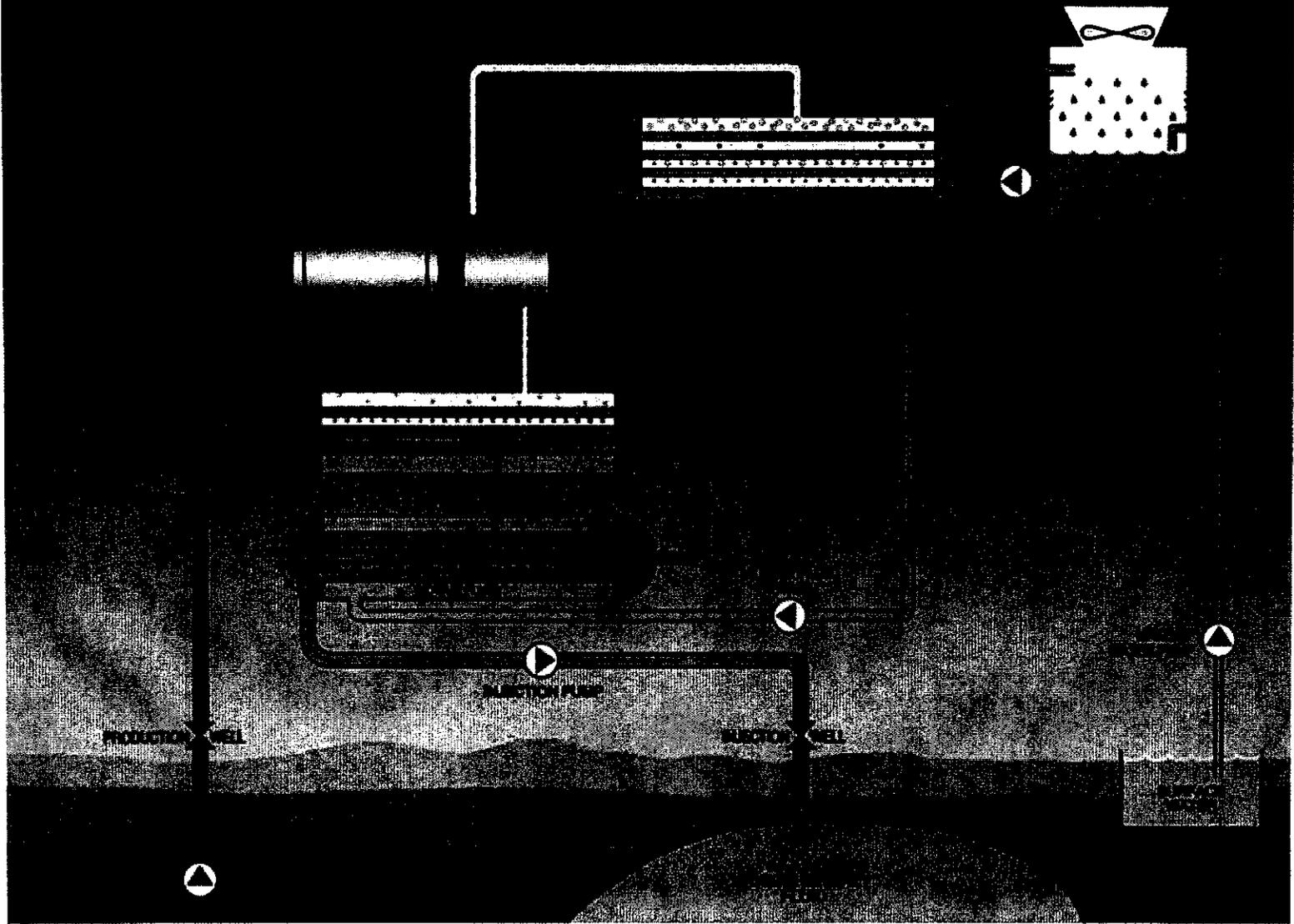
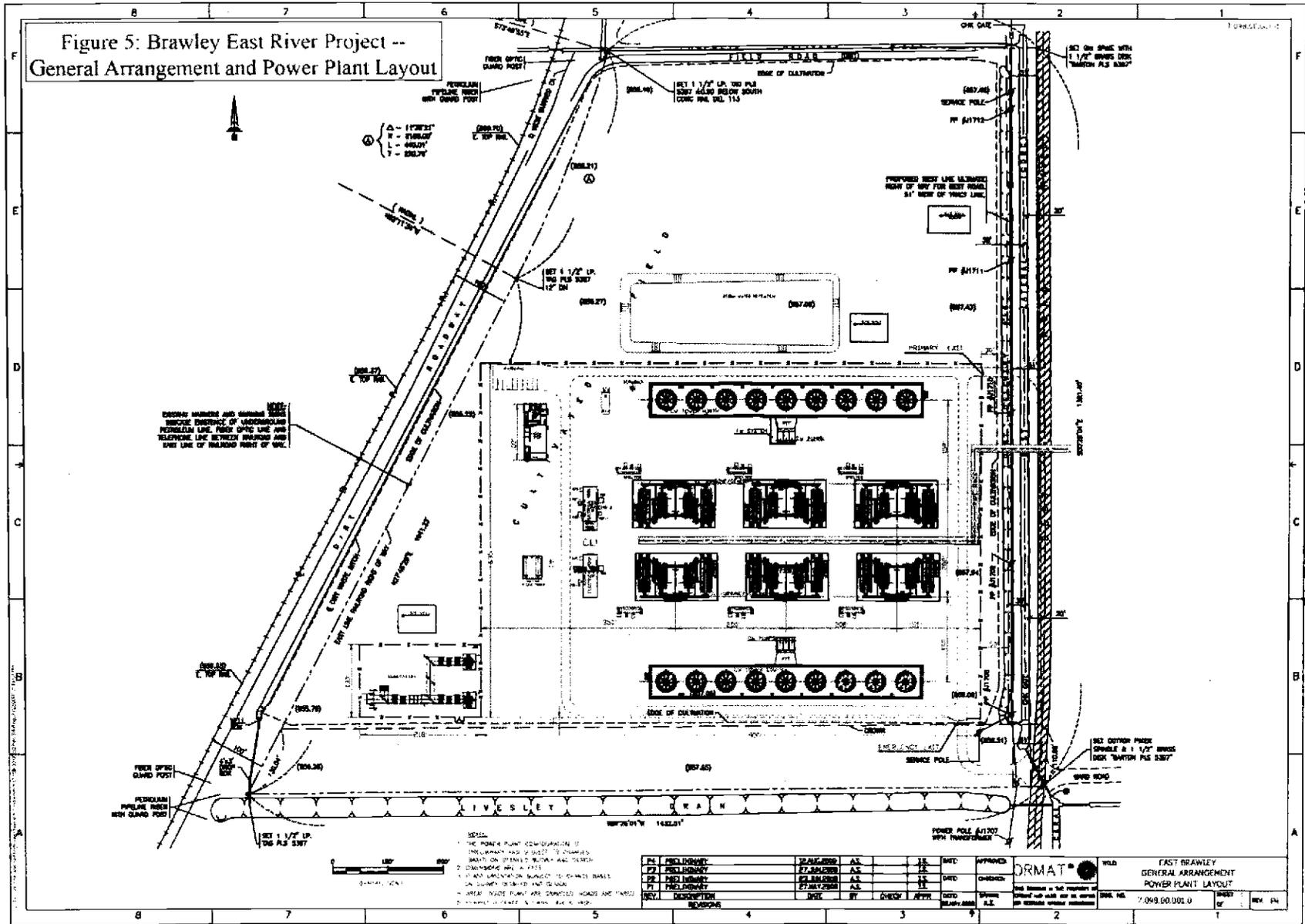


Figure 4: Schematic of Ormat Water Cooled Binary Geothermal Power Plant

Figure 5: Brawley East River Project --
General Arrangement and Power Plant Layout



TYPICAL WELL PAD LAYOUT DIAGRAM
BRAWLEY (EAST RIVER) GEOTHERMAL PROJECT

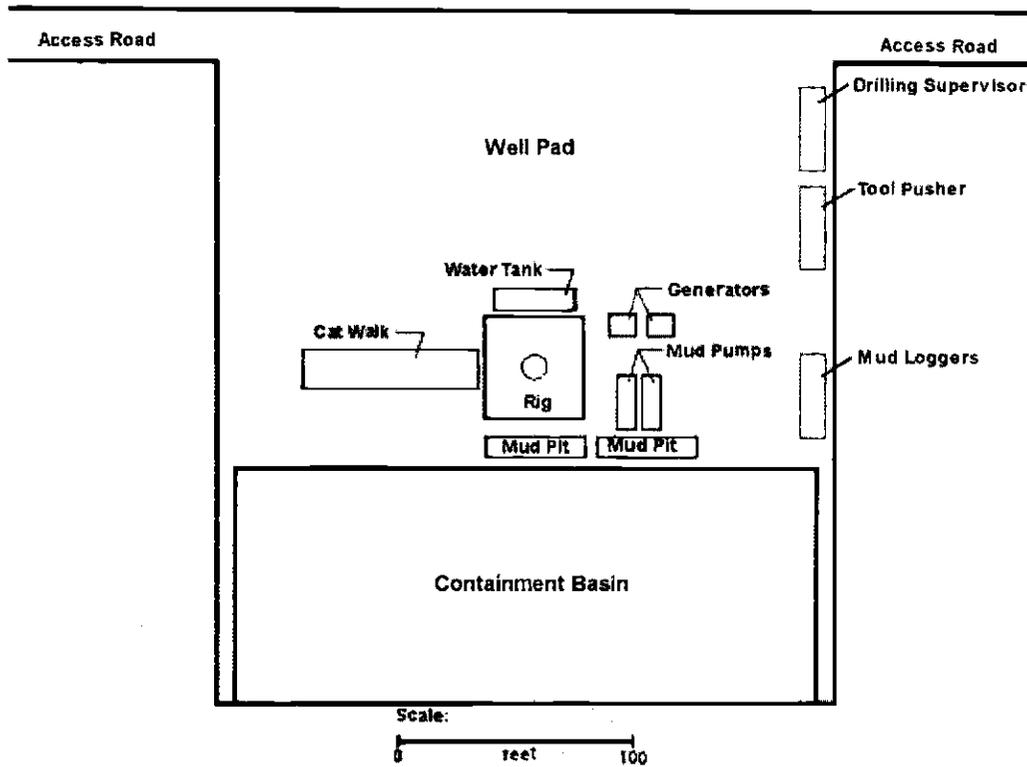
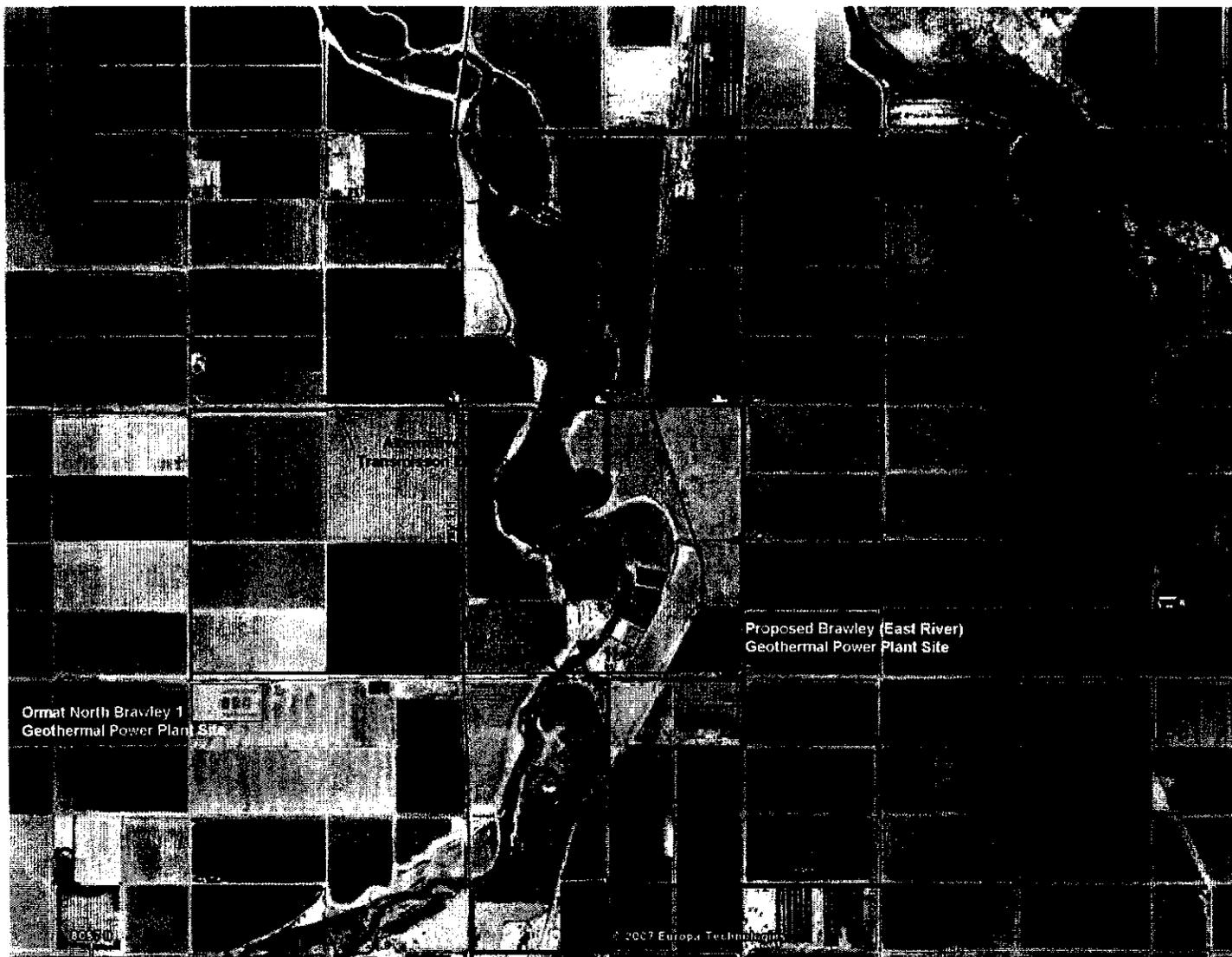


Figure 6: Typical Well Pad Layout Diagram



0.0 0.5 1.0 miles
 0.0 0.5 1.0 1.5 km

Project Area Extents
 Shown on the Figure:

Proposed West Transmission Line Route: ———
 Alternative North Transmission Line Route: ———

TN* MN
 12°

Figure 7: Proposed and Alternative Transmission Line Routes

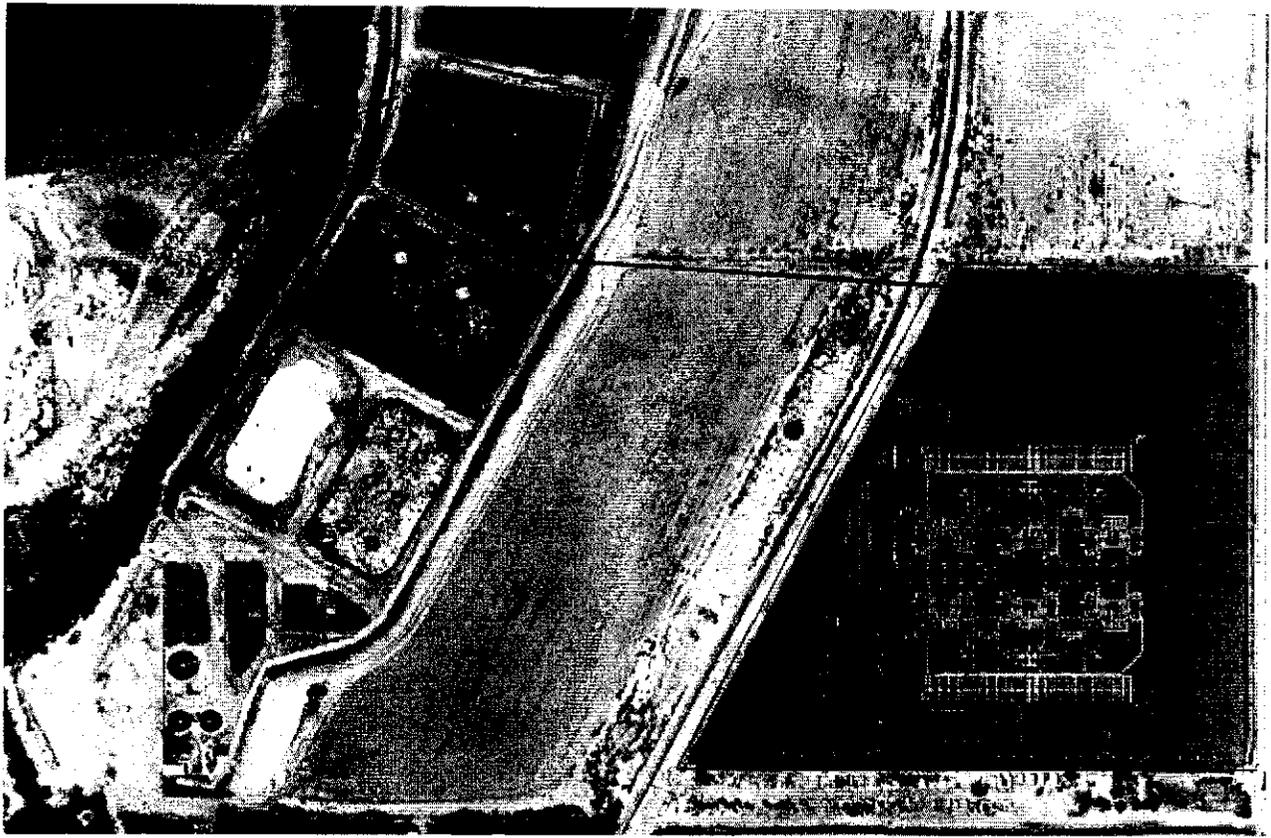


Figure 8: Proposed Tertiary Water Pipeline Route

APPENDIX C
11-CAI-2

**NORTH BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT
CONDITIONAL USE PERMIT
APPLICATION**

ORMAT®



**North Brawley
GEOHERMAL DEVELOPMENT PROJECT**

**APPLICATION FOR A
CONDITIONAL USE PERMIT**

June 2007

Submitted to:

**County of Imperial
Planning & Development Services Department
801 Main Street
El Centro, CA 92243-2811**

Submitted by:

**ORNI 18
Ormat Nevada Inc.
6225 Neil Road, Suite 300
Reno, NV 89511**

**North Brawley Geothermal Development Project
Conditional Use Permit Application**

NORTH BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT

CONDITIONAL USE PERMIT APPLICATION

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NORTH BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT

CONDITIONAL USE PERMIT APPLICATION

INTRODUCTION

ORNI 18, LLC, a wholly owned subsidiary of Ormat Nevada, Inc. (Ormat), proposes to build the North Brawley Geothermal Development Project in the vicinity of the North Brawley Geothermal Exploration Project covered by Conditional Use Permit #06-0021 and the Environmental Impact Report (EIR) for the Geothermal Overlay Zone (g-overlay zone). This project is just north of the town of Brawley in Imperial County, California (see Figure 1).

This Conditional Use Permit application is for the construction of a new 49.9 net MW binary power plant composed of six (6) Ormat Energy Converters (OEC), a transmission line interconnect, the geothermal well field beyond the six wells permitted by CUP #06-0021, pipelines to bring the geothermal fluids to the power plant and brine to wells for injection and a water conveyance system to bring water from the Imperial Irrigation District (IID) to the power plant for cooling.

BACKGROUND

The North Brawley Geothermal Development Project would be located on private agriculture lands just north of the City of Brawley in Sections 9, 16, 17, 20 and 21, Township 13 South, Range 14 East, San Bernardino Base and Meridian in the North Brawley Known Geothermal Resource Area. The project area is in the same general area of the former Southern California Edison 10 MW Brawley Unit 1 geothermal experimental power plant and the geothermal wells drilled by Unocal for the project (Figure 2). It is the g-overlay zone that was permitted by the Final EIR dated April 1979 that includes Ormat's proposed power plant project which will not utilize the previous power plant location or well sites. Additionally, the former power plant and wells have been plugged and abandoned.

The southern boundary of the project area is about 1 mile north of the City of Brawley. The city is currently updating their general plan which will not include residential development north of the new Highway 111 bypass (Figure 2). This includes the city's "sphere of influence." The bypass is scheduled to start construction in the late fall of 2007 by Caltrans and follow Shank and then Fredericks Road on the north of town. The first phase of construction will take the bypass as far as the New River. This is the only substantial change in the area since the EIR was completed in 1979. The project will use Hovley Road for primary access to the power plant site. Highway 111, and county roads N. Baughman and Andre Road will be used to access well locations. There are also farm and IID ditch roads that will be used to access some well locations.

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The Ormat North Brawley Geothermal Development Project would consist of the following facilities:

- (a) A 49.9 MW (net) geothermal power plant, consisting of six OEC binary generating units (OEC Units 1 through 6) with vaporizers, turbines, generators, condensers, preheaters, pumps and piping, motive fluid storage, a motive fluid vapor recovery system, two cooling towers with 8-10 cells each, substation, approximately a 250 foot transmission line interconnect and related ancillary equipment;
- (b) A control room, office, maintenance shop and other facilities located at the power plant site;
- (c) Twenty to 26 (6 may be production or injection) production wells averaging 3000 feet deep, including four of the six exploration wells, with associated pumps, piping, electrical and other related ancillary equipment;
- (d) Fourteen to 20 (6 may be production or injection) injection wells, including two of the six exploration wells, averaging 3000 feet deep with associated pumps, piping, electrical and other related ancillary equipment;
- (e) Piping from production wells to the power plant and from the power plant to the individual injection wells;
- (f) Blowdown(s) wells at the power plant site for cooling tower Blowdown;
- (g) Pumps, tanks, valves, controls, flow monitoring and other necessary appurtenances to the above wells and pipelines;
- (h) Maintenance of the production and injection wells cited in (c), (d), (e), (f) and (g), above;
- (i) Piping, canals or ditches and pumps to bring water from the Westside Main Canal to the power plant; and
- (j) Transmission line to interconnect to the IID system.

PROJECT DESCRIPTION

Project Overview

ORNI 18 LLC/Ormat Nevada Inc. proposes to construct, operate and maintain the North Brawley Development Project (see Figure 3):

- Install six 12.5 MW (gross) Ormat Energy Converters (OEC), each consisting of vaporizers, turbines, a generator, condensers, preheaters, pumps and piping, to generate 49.9 net mw's of electricity;
- Install two (2) 8 to 10-cell film, counter flow, induced draft cooling towers, each one supporting 3 OEC units, and other ancillary components to support the OEC Units;
- Connect the new OEC Units to the geothermal fluid production and injection piping system, electrical equipment and ancillary systems, and electrical transmission system;



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- Add as production wells four of the six geothermal exploration wells (OB-1, OB-2, OB-4 and OB-6) approved as the North Brawley Geothermal Exploration Project in CUP #06-0021 and connect these wells to the new geothermal brine pipeline system;
- Add as injection wells two of the six geothermal explorations wells (OB-3 and OB-5) and connect these wells to the new injection pipeline system;
- Build a water conveyance system to bring water from the IID Westside Main Canal to the power plant for cooling water.
- Build a transmission line to interconnect with IID's 92 kV transmission line that runs parallel to Hovley Road or their 161 kV line 3.5 miles east of the project parallel to Andre and then Ward Road.

Ormat plans to begin Project construction in the fall of 2007 and begin Project operation in the spring of 2008.

Project Location and Access

The proposed North Brawley Geothermal Power Plant Project would be located on private agriculture lands in the Southeast corner of Section 17, Township 13 South, Range 14 East, SB B&M, identified as Assessor's Parcel Number (APN) 037-130-40-01 and be approximately 1100 feet by 600 feet in size.

The North Brawley Geothermal Development Project wellfield areas (see **Error! Reference source not found.**) consist of private lands zoned Geothermal Overlay located in:

- Section 9, 16, 17, 20 and 21, Township 13 South, Range 14 East, SBB&M;

The geothermal production and injection wells proposed for this development project are listed, together with the assessor parcel numbers for the land on which they are located, in Table 1.

Primary highway access to the Project area is from Interstate 8 (about 16 miles south), north on California State Highway 111, west on California State Highway 78 and north on North Western which turns into Hovley Road just north of the City of Brawley (see Figure 2). Immediate access to the power plant site would be from Hovley Road. Improvements to Hovley Road would be provided at the plant entrance with a commercial driveway. Ingress and egress will be right turn only. Immediate access to the new production and injection well sites would be off of Hovley Road, N. Baughman Road, Andre Road and Hwy 111 (see Figure 3). Encroachment permits for ingress/egress and irrigation canal and drain crossings would be obtained from the California Department of Transportation, the Imperial County Public Works Department and Imperial Irrigation District, as applicable and required.

Existing access would be utilized to the extent practical. Any new access required for the Project would be constructed adjacent to the edges of the agricultural fields and parallel to irrigation canals and drains that traverse the Project area. New access roads would be



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constructed or improved and maintained as needed to safely accommodate the traffic required for the Project activities. Road widths would typically be a minimum ten feet.

North Brawley Project Power Plant

The North Brawley power plant would be located within an approximately 1100-foot by 600-foot area (about 12.7 acres) just east of Hovley Road. Figure 4 shows the general arrangement of the power plant facilities (map view).

Figures 5 and 6 are basic block diagrams of the power plant, which shows how the three separate fluids (geothermal fluid, isopentane working fluid and cooling water) flow through each of the OEC Units. Figure 7 shows a perspective view of one of the six OEC Units. Each of the six OEC Units would be able to operate independently of other, but would share common ancillary components (additional isopentane storage, geothermal fluid supply and injection, the electrical substation, etc.).

The geothermal fluids from the production wells would flow through the level 1 and level 2 vaporizers and preheaters of each OEC Unit, transferring the heat to the isopentane working fluid through the OEC Unit shell-and-tube heat exchangers. The cooled geothermal fluid would then be sent to the geothermal fluid injection system without coming in contact with the atmosphere.

The vaporized isopentane working fluid from the level 1 and level 2 vaporizers would turn the level 1 and level 2 turbines, which together would turn a common generator, which would produce the electrical energy which would be delivered to the existing IID 92 kV or 161 kV electrical transmission systems through the new electrical substation (Figure 8 – the substation is shown in the SE instead of the SW corner). The vaporized isopentane would be condensed in a shell-and-tube condenser and returned to the preheaters and vaporizers to repeat the cycle.

The isopentane vapor condenser would be cooled by water circulated from the cooling tower. Water from the condensers is cooled in the cooling tower by evaporating the circulating water. Water for the cooling tower and the make-up water to replace the evaporated water would be obtained under contract from the Imperial Irrigation District (IID). Figure 9 shows the IID canals in the area of the project and the options for water conveyance to the power plant as described below. A small portion of the circulating water would be injected into the geothermal reservoir with the geothermal injection fluid or through a dedicated blowdown injection well(s) to remove dissolved salts which are concentrated through the evaporation process.

Water Conveyance Options

- Water would be gravity fed in an underground pipeline 30-36" in diameter



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Or

- Water would be pumped in an underground pipeline 10-12" in diameter

Or

- Water would be conveyed in existing or new open canals or ditches

And

- Pipelines may be aboveground where brine pipelines are built.

Alternative 1

Westside Main Canal (WSM) to the Spruce Canal (SC) to Spruce Lateral 4 to a conveyance to the plant.

Alternative 2

WSM to the SC to the Smilax to the Smilax Lateral 1 to a conveyance to the plant.

Alternative 3

WSM to the SC to the Smilax to the Smilax Lateral 1 to the Spruce Lateral 1 to a conveyance adjacent to Hovley Road to the plant.

Alternative 4

WSM to the Tamarack to a conveyance along Andre Road to the plant.

Alternative 5

WSM to a conveyance along Tamarack and then Andre Road to the plant.

Alternative 6

WSM to the SC to the Smilax to the Smilax Lateral 1 to the Spruce Lateral 1 to an existing drainage ditch to the plant.

Construction of the power plant would require approximately eight to ten months, although it may take longer if the six OEC Units are constructed in sequence, rather than at the same time. Construction would require an estimated 50 to 60 workers. Construction is scheduled to commence in the fall of 2007. Production and injection well drilling and pipeline construction in the wellfield would be conducted concurrently.



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Isopentane Motive Fluid System and Fire Suppression

The isopentane motive fluid system includes the isopentane side of the OEC Units, two (2) 8800 gallon isoisopentane storage tanks, and an OEC vapor recovery unit (VRU) on each OEC condenser. A vapor recovery unit would be used during major maintenance activities on any of the OEC Units.

Each OEC Unit contains approximately 23,000 gallons of isopentane (in the vaporizers, preheaters, condensers and piping). In each OEC, the motive fluid system is designed as a closed-loop, although there would be minor leaks from the valves, connections, seals, and tubes. Isopentane from these leaks would be released to the atmosphere or would leak into the geothermal or circulating cooling water lines. Operators will frequently inspect the OEC Units leaks and visual signs of fugitive emissions. Isopentane leak detectors are utilized throughout the facility and continuously monitored.

Any noncondensable gases in the air or water which may leak into the isopentane system would eventually collect in the OEC condenser and reduce the efficiency of the OEC Unit. In order to remove these noncondensable gases, each OEC condenser would have a small (~0.106 scf/hr) OEC VRU. Each OEC VRU would consist of two chambers and a set of isolation valves. Operation of each OEC VRU would be controlled by the power plant computer control system, which would start the OEC VRU noncondensable gas "purge" sequence whenever the efficiency of the OEC Unit fell below a set point. During "purging," nearly all of the isopentane vapors in the OEC VRU would be compressed into liquid isopentane and returned to the OEC Unit, while the noncondensable gases, together with some small quantity of isopentane vapors, are discharged to the atmosphere.

Some major maintenance activities require that at least a portion of an OEC Unit be cleared of isopentane motive fluid liquid and vapors prior to performing the maintenance activities. To control and minimize isopentane emissions during these maintenance activities, the liquid isopentane is drained from the section of the OEC Unit (preheater, vaporizer or condenser) to be maintained or repaired and transferred to another portion of the OEC Unit, the isopentane storage tank, or another OEC Unit. A vacuum pump would then be used to evacuate and compress most of the remaining isopentane vapors, returning the isopentane liquid to the OEC Unit. Those isopentane vapors which do not condense would be released through the isopentane vapor recovery unit, which would adsorb nearly all of the remaining isopentane vapors.

To reduce the risk of fire, isopentane vapor and flame detectors connected to the power plant computer control system are placed at strategic locations around the OEC Units to quickly alert the plant operators to any such hazardous situations. The fire suppression system would include an approximately 2800 gpm diesel fire water pump. Water nozzles/monitors would be placed at



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the power plant site to be used to minimize the risk of a fire spreading should one start within the power plant. A Risk Management Plan will be prepared for this facility for isopentane.

Cooling Water System

Each of the two (2) 8 to 10-cell cooling towers would circulate an average of approximately 240,000 gallons per minute (gpm) of cooling water to its associated OEC Units. An average of approximately 4340 gpm of circulating cooling water would be evaporated from both cooling towers, and both would also blowdown (discharge) an average of approximately 1860 gpm. To maintain its water balance both cooling towers would require an average of approximately 6200 gpm of cooling tower makeup water. This water would be obtained from the IID. Sodium Hypochlorite (bleach) will be used for bacterial control in the towers as well as other chemicals for pH control and inhibition.

Cooling water blowdown from the cooling towers would be injected into the geothermal reservoir through either the geothermal fluid injection wells or a dedicated injection blowdown well(s).

North Brawley Wellfield

Geothermal resources required to power the power plant would be supplied from four of the six geothermal exploration wells approved under CUP #06-0021 and an additional 16 to 22 production wells, for a total of 20 to 26, surrounding the power plant location (see Figure 3). The average depth of the wells will be 3000 feet. The final determination will be based on geological and reservoir information obtained as wells are drilled. The California Department of Oil, Gas and Geothermal Resources (CDOGGR) authorizes the drilling of the wells under a Notice of Intent. Mr. Michael Woods, Petroleum Engineer for the CDOGGR El Centro office, reviews and approves the drilling program for each well including the blow out prevention equipment (BOPE) to insure the drilling operations are safe and will protect the community, land and water resources.

Two of the six exploration wells are planned for injection and an additional 12 to 18 new geothermal fluid injection wells would be required to inject the geothermal fluid produced for the Project back into the geothermal reservoir for a total of 14 to 20 injection wells (see Figure 3). They will also average 3000 feet in depth and go through the same review with the CDOGGR as the production wells.

Appendix A provides a description of the activities which may be required to drill the geothermal production, injection and blowdown wells for the Project. As geothermal production and injection wells age they typically produce less and/or cooler geothermal fluid, or inject less fluid, and may need to be redrilled or worked over. Redrilling or reworking a well requires many of the same activities required to drill a new well, as described in Appendix A.



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Any of the geothermal production wells which did not demonstrate sufficient commercial productivity may be converted to an injection well. Any of the wells could also be converted to a monitoring well, or could be abandoned. Any such change in status would be conducted as described in Appendix A, and in conformance with the requirements of the CDOGGR.

Dedicated Blowdown wells are drilled the same as an injection well. The only difference is the fluids they take for injection is the water from the cooling tower which is not geothermal brine.

Well Site Production and Injection Equipment

Each new production well would be equipped with a pump driven by a vertical electric motor located on top of the well pump discharge head. A small, truck-mounted well maintenance rig would install these pumps in the wells. Other small trucks and vehicles would be involved in installing the pump, which is normally conducted only during daylight hours. An electric cable installed along the pipeline from the power plant would provide the electricity to power the well pump motor. Either water or mineral oil is pumped down from the surface at the rate of one to three gallons per day to lubricate the downhole pump lineshaft bearings. This lineshaft bearing lubrication water or mineral oil would be discharged into the produced geothermal fluid and eventually injected into the geothermal fluid injection reservoir. The mineral oil is less than .001%, less than 2 ppm, of the volume injected.

Production wellhead dimensions are not expected to exceed a height of fifteen feet above the ground surface or four feet in diameter. An approximately 8-foot by 15-foot, 10-foot high motor control building may be located within approximately 50 feet of each production well. It would house and protect the auxiliary well systems, motor switch gear controls and sensors, and transmitters for temperature, pressure, and flow rate data. The wellhead, pump motor and motor control building would each be painted an appropriate color to blend with the area and minimize visibility.

Neither wellhead pumps nor the auxiliary equipment or motor control buildings are required at the injection well sites. Instead, injection pumps located at the power plant site would pump the geothermal injection fluid through the injection pipeline system, providing sufficient pressure to inject the cooled geothermal fluid back into the geothermal reservoir.

Geothermal Pipeline Systems

Each of the production wells would deliver geothermal fluid to the power plant through new production pipelines routed in corridors adjacent to existing farm roads or parallel to, but outside of the rights-of-way of County roads or State Highways. The total length of new production pipeline would depend on which of the production wells were connected to the power plant. If all 20 to 26 wells were connected, then approximately 7 miles of new production pipeline would be constructed. The pipelines would be in the lands leased as shown



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in Table 1. Ormat will work with the farmers to obtain easements for the placement of the pipelines to minimize impact to farming operations and to stay outside of county rights-of-way, not only existing but for future expansion, for example, the proposed expansion of Hovley Road to 4 lanes.

Similarly, the injection fluid pipelines to the 14 to 20 injection well sites would be routed in corridors adjacent to existing farm roads or parallel to, but outside of the rights-of-way of County roads or State Highways. In some sections the injection pipeline would also parallel the new production pipeline. Here the injection pipeline would either be placed adjacent to, or atop ("piggyback") the production pipeline. The total length of new injection pipeline would also depend on which of the injection wells were connected to the power plants. If all 14 to 20 wells were connected, then approximately 7 miles of new injection pipeline would be constructed.

The production and injection pipelines would be constructed from steel pipe designed, constructed, tested and inspected pursuant to current industry standards for high temperature, high pressure piping. The diameter of the steel pipe would vary depending on the type and amount of geothermal fluid to be conveyed. Once covered with about two inches of insulation and a protective metal sheath (appropriately colored to blend with the area), the overall outside diameter of the finished pipe would range from 10 to 30 inches. The pipelines would be constructed near ground level (averaging about one foot off the ground) on pipeline supports installed approximately every 20 to 40 feet along the pipeline routes.

"Expansion loops" would be constructed about every 250 to 500 feet along the production pipeline route so that the pipeline could "flex" as it lengthens and shortens due to heating and cooling. These square bends in the pipeline are typically horizontal, approximately 40 feet in length by 40 feet in width. Some expansion loops are vertical, although these are typically smaller, about 15 feet high. Electrical power and control cables for the production well pump motors and valves, and production and injection wellhead instrumentation would be installed in steel conduit constructed on the pipe supports or, in some circumstances, buried in a trench dug next to the pipelines. Injection pipelines have fewer expansion loops.

No new roads would be built for pipeline construction or maintenance, and pipeline construction would not require grading of the pipeline route. The pipeline would be constructed under existing roads to allow continued access. Pipeline crossings of any unpaved roads (including Andre) would typically be constructed by the cut-and-fill method, which minimizes the time during which traffic on the road would be impacted. A trench would be cut through the road and a prefabricated "U"-shaped section of insulated, wrapped geothermal fluid pipe, placed inside a larger diameter pipe or otherwise protected so that it is strong enough to support traffic on the road above, would be placed in the trench. The excavated dirt would then be backfilled and compacted around and above the pipeline or pipe sleeve, and the roadbed material would be repaired or replaced. Access would typically be restricted for only a few hours during actual construction. Appropriate traffic controls (including detour signs) would be



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in place during any construction within the roadbed or adjacent shoulders of each road to warn and control traffic.

For the crossing of Highway 111 and other paved roads such as Hovley Road, the pipeline and accompanying power and control cables will be installed by cut and fill technique or with micro-tunneling procedures. The latter technique does not disrupt traffic and neither technique would not cause settlement of the road bed. Micro-tunneling would be conducted by specialty contractors using specialized equipment. Oversize steel casing would be installed behind a boring machine that would be advanced under the road by "jacking." Pits would first be excavated and braced at each end of the casing run. The boring machine and casing sections would then be lowered into one pit. The boring machine (with casing behind it) would be "jacked" under the road using specially designed jacks. Casing sections would be welded together as they are moved forward to form a continuous casing under the road. Once the welded casing is in place under the entire road the boring machine would be removed through the other pit. Cement grout under pressure would be used to fill any voids between the casing and the dirt under the road.

Pipeline crossings of the Imperial Irrigation District (IID) canals or drains would be above ground. All IID canal and drain crossings would be engineered and constructed in conformance with the applicable IID encroachment permit requirements. Field drains and head ditches would be crossed by the pipelines as agreed to with the individual landowner/geothermal lessor.

Pipeline construction would be conducted concurrently with construction of the power plant.

Abandonment

The projected life of the Project is a nominal 30 years. At the end of the useful life of the Project, equipment and facilities would be properly abandoned.

The geothermal wells would be abandoned in conformance with the well abandonment requirements of the CDOGGR. Abandonment of a geothermal well involves plugging the well bore with clean drilling mud and cement sufficient to ensure that fluids would not move across into different aquifers. The well head (and any other equipment) would be removed, the casing cut off at least six feet below ground surface, and the well site reclaimed.

At the end of power plant operations, the Project would prepare and implement a Site Abandonment Plan in conformance with Imperial County and CDOGGR requirements. The Plan would describe the proposed equipment dismantling and site restoration program in conformance with the wishes of the respective landowners/lessors and requirements in effect at the time of abandonment. Typically, above-ground equipment would be dismantled and removed from the site. Some below ground facilities may be abandoned in place. The surface of the site would then be restored to conform to approximate pre-Project land uses.



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Environmental Protection Measures

All Ormat and contractor personnel would be informed of Ormat's policy regarding undue degradation of the environment. These measures are intended to prevent all unacceptable impacts from occurring as a result of the site construction and Project operations.

Fire Prevention: The construction sites and access roads would be cleared of all vegetation. The cleared areas would be maintained during well drilling and power plant operations. Fire extinguishers would be available on the active sites. Water that is used for power plant operations and drilling would also be available for fire fighting. Personnel would be allowed to smoke only in designated areas.

Flammable gas vapor and flame detectors would be placed at strategic locations around the OEC Units and connected to the power plant computer system to detect potentially hazardous situations. The power plant would have a fire suppression and fire water supply system. Water nozzles/monitors would be placed around the power plant site.

Surface and Ground Water Quality Protection: The Project would submit a revised Report of Waste Discharge to the California Regional Water Quality Control Board, Colorado River Basin Region (CRWQCB), for the new geothermal injection wells and sumps, and would comply with the CRWQCB permit conditions to protect water resources. This would revise Orders R7-2007-0012 to cover the additional production and injection wells. The power plant site will drain to a stormwater retention basin. After a rain event the water will either be pumped to injection or discharged after sampling within 3-days as required by Imperial County Public Health Department design criteria to prevent mosquito harborage and breeding.

Ormat will supply bottled drinking water for the employees that work at the project. The IID water that is coming to the plant for cooling will also be used for the control room building and labeled as non-potable. The project is not scheduled to have more than 25 employees during normal operations.

The Project would also submit encroachment permit applications to the Imperial Irrigation District (IID) for roads and activities that may occur in IID rights-of-way, and would comply with the IID permit conditions to protect irrigation canals and other water delivery facilities in the area. Required permits would be obtained from the IID for any construction or drilling water to be produced from IID canals.

Surface water and ground water pollution from geothermal well drilling and testing would be prevented by steel casing cemented to below these zones.

Only non-toxic, non-hazardous drilling mud would be utilized during drilling operations. Waste drilling mud and drill cuttings would be stored in above-ground storage tanks or lined



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containment basins. Any runoff from the well sites would be discharged into containment basins. The well site containment basins would be constructed and maintained such that permeability would not exceed 1×10^{-6} cm/sec.

Wells would be cased and cemented to prevent interzonal migrations of fluids and reduce the possibility of blowouts. The Petroleum Engineer for the CDOGGR will review all drilling programs and approve the drilling of all production and injection wells as well as providing on-site inspections during drilling operations. No over-pressured or gas-rich zones are expected to be encountered.

Air Quality Protection: The Project would obtain an Authority to Construct to drill and test the new geothermal wells and an Authority to Construct and Permit to Operate for the new power plant and wellfield from the Imperial County Air Pollution Control District (ICAPCD). The Project would comply with any requirements of these permits concerning emissions of air pollutants from construction and operation of the power plant and well-drilling equipment including ICAPCD Rule 207 for control of hydrogen sulfide emissions.

The Project would also comply with the ICAPCD's requirements to control dust by implementing the requirements of ICAPCD Regulation VIII, Fugitive Dust Control. Fugitive dust generation during construction and use of non-surfaced access roads and well sites would be minimized by watering and restricting vehicle speeds, as necessary.

Prevention of Noise: The Project would comply with County-specified noise control measures, including:

1. Using hospital mufflers on diesel equipment used for drilling within 1,320 feet of any occupied residence, and using noise mufflers or silencers during well venting and testing at these wells;
2. Heavy truck traffic, well site preparation, and pipe stacking would be limited to the hours of 7:00 a.m. and 7:00 p.m. for any wells located within 1,320 feet of any occupied residence unless authorized by the County; and
3. Hydroblasters used in descaling operations when used within 1,000 feet of an occupied residence would be limited to the hours of 7:00 a.m. to 7:00 p.m. unless authorized by the County.
4. To further abate noise levels from drilling operations conducted within 0.25 miles (1,320 feet) of occupied residences, additional noise-reduction techniques, such as placing rubber mats on the V-door and placing hay bales around the drill rig engines, would be implemented. Ormat would also work with any residents living within 0.25 miles (1,320 feet) of any well to further reduce the noise impacts to them during the drilling operations.



North Brawley Geothermal Development Project Conditional Use Permit Application

Geotechnical and Geologic Hazards: Any necessary geotechnical investigations of soil characteristics affecting the power plant facilities would be conducted by a qualified geologist or engineer. The report of any geotechnical assessment would be made available to the County on request.

The facilities would be built in accordance with the County Building Code requirement applicable to "Seismic Zone 4." Building permits would be obtained for the Project from the County prior to commencement of power plant construction.

No human-occupied structures would be placed across the trace of an active fault, and no human-occupied structure would be placed within fifty feet of the trace of an active fault or within a seismic special studies zone without a geologic report, satisfactory to the State Geologist, demonstrating that no undue hazard would be created by the construction or placement of the structure. The closest surface expression of the Brawley fault is 4.4 miles southeast of the project at McConnell Road and the Lavender Canal.

The Project would participate in the County's subsidence detection program, with approval of the Imperial County Department of Public Works (ICPWD), to reflect any anticipated changes resulting from the Project. Subsidence monuments would connect with the County's geothermal subsidence detection network. The benchmarks would be installed to conform to County standards. Surveying would be performed to National Geodetic Survey (NGS) standards.

The Project would participate in the County's seismic monitoring program and would submit a plan to the ICPWD for approval.

Protection of Public Health and Safety: The Project would obtain required site access encroachment permits from the ICPWD and the IID, and would consider traffic safety in transporting equipment and materials to the Project site. Safety measures would include the use of temporary signs warning motorists on adjacent roadways when equipment is being brought to and from the Project site.

The Project would coordinate the movement of any required oversize loads on County roads with the ICDPW and/or on State highways with Caltrans and the El Centro California Highway Patrol office. Transportation of oversized equipment would be minimized as much as possible.

An Emergency Response Plan (ERP) would be developed for the project. The ERP would be maintained to cover possible emergencies (well blow-outs, major fluid spills, earthquakes, etc.). There would be at least one employee "on call" at all times (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility of coordinating all emergency response measures. The "on call" emergency coordinator would be



North Brawley Geothermal Development Project Conditional Use Permit Application

familiar with the ERP and would have the authority to commit the resources needed to carry out the contingency plan.

Project personnel and equipment would be available to respond to emergencies, including providing first aid during Project construction and operation with first aid training for Project employees.

A Hazardous Materials Management Plan (HMMP) would be prepared and submitted to the California Department of Toxic Substances Control (CDTSC), as the Certified Unified Program Agency (CUPA) for Imperial County. The HMMP would be maintained and revised as necessary.

Protection of Fish, Wildlife, and Botanical Resources: Direct impacts to wildlife habitat and botanical resources would be minimized by clearing only the area required for Project facilities and access roads. Any fish habitat would be protected through the prevention of erosion.

Well cellars would be designed to prevent wildlife entry and entrapment. Pipelines would be constructed so as not to become a barrier to wildlife movement.

Burrowing owls (*Athene cunicularia hypugaea*) are known to occur in the vicinity of the Project area. To ensure that no significant impacts to this species would occur from Project operations, Ormat has retained Marie Barrett, a qualified biologist, who has conducted preliminary surveys of the potentially affected portions of the Project area prior to conducting any surface disturbing activities. The surveys have followed established protocols (*Burrowing Owl and Survey Protocol and Mitigation Guidelines* (1993)) approved by the California Department of Fish and Game (CDFG). If burrowing owls are present in the Project area, Ormat would adopt the established mitigation guidelines and protocol guidance for avoidance of impacts to the species. Ormat has mitigated for burrowing owls at several of the well pads in the North Brawley Exploration Project and provided training to the drilling rig crews and trucking contractors.

Protection of Cultural Resources: The Project would monitor areas of surface disturbance and if any unusual specimens of bone, stone, or ceramic are discovered during construction of the facilities, all construction affecting the discovery site would be suspended until a qualified archaeologist reviewed the specimens. The Project would comply with the recommendations of the archaeologist prior to resuming construction. However, the area was surveyed for the EIR and no resources were found at that time and are not anticipated to contain any due to the number of years of farming.

Prevention of Soil Erosion: No cut or fill slopes would be needed to construct any of the Project sites. Runoff would be channeled to energy dissipaters as necessary to minimize erosion. In addition, the Project would adopt relevant CRWQCB best management practices if



North Brawley Geothermal Development Project Conditional Use Permit Application

necessary to further prevent soil erosion. A Storm Water Pollution Prevention Plan would be prepared for the power plant site construction.

Prevention of Spills: Blowout prevention equipment (BOPE) would be used on all geothermal wells in accordance with the requirements of CDOGGR.

The power plant site would be designed and constructed to prevent spills from leaving the site and endangering adjacent properties and waterways, and to prevent runoff from any source being channeled or directed in an unnatural way so as to cause erosion, siltation, or other detriments. A system of pressure and flow sensing devices and regular inspection of all lines, capable of detecting leaks and spills, would be instituted and maintained.

Visual Resources: Power plant and drill rig lighting would be projected downward to mitigate nighttime visibility of the facilities. The cooling towers will produce a visible water vapor plume in the daylight depending on the relative humidity and ambient temperature, mostly in the early morning. The plume will be visible from Highway 111, nearby farm residents and the north end of the City of Brawley. Drift eliminators required by the ICAPCD help to reduce the plume. Dry or air cooling is not an option for this facility due to the high summer ambient temperatures.

Waste Disposal: During well drilling operations, a containment basin would be located on each well site. All used drilling mud and cuttings would be contained in these basins until drilling operations on each well site were complete. Alternatively, all used drilling mud and cuttings would be discharged into steel tanks.

After drilling operations were complete, the mud and associated drilling liquids would be allowed to evaporate. The solids would be tested for pH, oil and grease, and metals (TTLIC and TCLP) or as required by the Waste Discharge Orders from the CRWQCB. If the solids were inert, and if authorized by the landowner and the CRWQCB, these materials would be spread and dried on the site, then buried in the on-site containment basin in conformance with the applicable requirements of the CRWQCB. If burial on site was not authorized by the landowner or the CRWQCB, the solids would be removed and disposed of in a waste disposal facility authorized to receive and dispose of these materials.

During power plant construction and drilling operations, portable chemical sanitary facilities would be used by all construction and drilling personnel. These facilities would be maintained by a local contractor.

During construction, drilling and power plant operations, the Project would ensure that any generated wastes, liquid or solid, would be disposed of in compliance with all appropriate local, state, and federal regulations. Any discharges into surface water would meet all requirements of the CRWQCB (e.g., National Pollution Discharge Elimination System permit restrictions) and



North Brawley Geothermal Development Project Conditional Use Permit Application

solid wastes would be disposed of in an approved solid waste disposal site in accordance with County requirements. Solid waste materials (trash) would be routinely collected and deposited at an authorized landfill by a disposal contractor.

The binary power plant process does not expose the geothermal brine to atmosphere unlike the flash system used at the Salton Sea. Thus, the binary process does not generate geothermal scale and solids seen in a flash power plant. Additionally the total dissolved solids in the North Brawley resource is less than 10% of that seen in the Salton Sea resources. The project is not expected to generate brine waste and/or impact landfill facilities in Imperial County.

Environmental Monitoring: Regular, routine visual inspections of the power plant and wellfield facilities and access roads would be conducted by the on-site operations personnel to quickly detect and correct any operational issues that could lead to environmental problems. An Environmental Specialist would monitor and inspect the operations, as necessary, and be responsible for implementation and enforcement of all mitigation measures placed on the project by the regulatory agencies who will issue permits for the construction and operation of the project.



Table 1: Proposed Project Land Ownership Information

	Assessor's Parcel Number	Zoning	Surface Land Owner	Well Site Access	Nearest Residence
OB-1	APN:037-140-02 (325.47 Acres)	A2G	Victor V. & Janet D. Veysey Trust 3651 Austin Road Brawley, CA 92227 (760) 344-9800	Along farm road south of N. Baughman Road and north of Andre Road access	~ 0.25 miles southwest
OB-2 OB-11 OB-15	APN: 037-140-02 (325.47 Acres)	A2G	Victor V. & Janet D. Veysey Trust 3651 Austin Road Brawley, CA 92227 (760) 344-9800	Along farm road south of Baughman Road east and north of Andre Road access east of the State Highway 111	~ 0.25 miles west-northwest
OB-3 OB-7 OB-8 OB-9 OB-10 OB-12 OB-13 OB-14	APN: 037-140-01 (325 Acres)	A2G	Victor V. & Janet D. Veysey Trust 3651 Austin Road Brawley, CA 92227 (760) 344-9800	Along IID ditch on the southside of Baughman Road west of the State Highway 111 access	~ 0.45 miles east-northeast
OB-4 OB-16 OB-23	APN: 037-160-47 (36.27 Acres)	A2G	Victor V. & Janet D. Veysey Trust 3651 Austin Road Brawley, CA 92227 (760) 344-9800	Along farm road east of Hovley Road access	~ 0.56 miles south
OB-5 OB-6 OB-17 OB-18 OB-19 OB-20 OB-24 OB-25 OB-26 OB-29 OB-30 OB-31	APN: 037-130-40 (240 Acres)	A2G	John Robert Benson and Barbara Meyer P.O. Box 239 Brawley, CA 92227 (760) 344-4591	Along farm road east of Hovley Road access	~ 0.52 miles west

**North Brawley Geothermal Development Project
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OB-21 OB-22 OB-27 OB-28 OB-32 OB-33	APN: 037-130-41 (240 Acres)	A2G	Barbara Meyer P.O. Box 239 Brawley, CA 92227 (760) 344-4591	Along farm roads west of Hovley Road access	~0.25 miles South
OB-34	APN 037-130-50 (76.33 acres)	A2G	Jack Bros., Inc. P.O. Box 116 Brawley, CA 92227 (760) 427-3439	Along farm roads east of Hovley Road	~0.5 miles west
OB-35 OB-36 OB-38	APN 037-130-42 (80 acres)	A2G	John Robert Benson and Barbara Meyer P.O. Box 239 Brawley, CA 92227 (760) 344-4591	Along farm roads east of Hovley Road	300 feet southeast
OB-37	APN 037-130-21 (40 acres)	A2G	Daniel H and R.J. Lillywhite P.O. Box 1387 Brawley, CA 92227	Along farm roads west of Hovley Road	300 feet northwest
OB-39 OB-40	APN 037-160-29 (112.49 acres)	A2G	Brawley Development Group c/o Tierra Management 4563 E. 30 th Place Yuma, AZ 85365 (928) 284-5300	Along farm road/IID road north of Fredericks Road east of Hovley Road	1.5 miles west



APPENDIX D
11-CAI-2

**AGREEMENT FOR CONDITIONAL USE PERMIT
NORTH BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT**

1 Please return to:

2 Imperial County Planning & Development Services Department
3 801 Main Street
4 El Centro, CA 92243

5
6
7
8 **AGREEMENT FOR**
9 **CONDITIONAL USE PERMIT #07-0017**
10 **ORMAT NEVADA, INC/ORNI 18, LLC**

11 This Agreement is made and entered into on this 14th day of November 2007, by
12 and between Ormat Nevada, Inc. and ORNI 18, LLC, hereinafter referred to as Permittee,
13 and the COUNTY OF IMPERIAL, a political subdivision of the State of California,
14 (hereinafter referred to as "COUNTY").

15
16 **RECITALS**

17 **WHEREAS**, Permittee is the owner, lessee or successor-in-interest in certain land
18 in Imperial County located east of Hovley Road, west of State Highway 111, north of the
19 City of Brawley, California, described as the southeast corner of Section 17, Assessor's
20 Parcel Number 037-130-040-000, Township 13 South, Range 14 East, SBB&M; and,

21 **WHEREAS**, Permittee has applied to the County of Imperial for a Conditional Use
22 Permit #07-0017 ("Project") for the above geothermal power plant project;

23 **GENERAL CONDITIONS:**

24 The "GENERAL CONDITIONS" are shown by the letter "G". These conditions are conditions that
25 are either routinely and commonly included in all Conditional Use Permits as "standardized
26 conditions and/or are conditions that the Imperial County Planning Commission has established
27 as a requirement on all CUP's for consistent application and enforcement. The Permittee is
28 hereby advised that the General Conditions are as applicable as the Site Specific conditions.

29 **G-1 GENERAL LAW:**

30 The Permittee shall comply with all local, state and/or federal laws, rules, regulations,
31 ordinances, and/or standards as they may pertain to the project, whether specified herein
32 or not.

1
2 **G-2 PERMITS/LICENSES:**

3
4 The Permittee shall obtain any and all local, state and/or federal permits, licenses, and/or
5 other approvals for the construction and/or operation of the Project. This shall include,
6 but not be limited to, local requirements for Health, Building, Sanitation, ICAPCD, Public
7 Works, Imperial County Sheriff, Fire/Office of Emergency Services, Regional Water
8 Quality Control Board, California Division of Oil, Gas and Geothermal Resources
(CDOGGR), among others. Permittee shall likewise comply with all such permit
requirements and shall submit a copy of such additional permit and/or licenses to the
Planning and Development Services Department within 30 days of receipt, as deemed
necessary.

9 **G-3 RECORDATION/COMMENCEMENT OF WORK:**

10 This permit shall not be effective until it is recorded at the Imperial County Recorders
11 Office and payment of the recordation fee shall be the responsibility of the Permittee. If
12 the Permittee fails to pay the recordation fee within six (6) months from the date of
13 approval, this permit shall be deemed null and void. The Planning and Development
14 Services Department will submit the executed CUP to the Imperial County Recorder's
office for recordation purposes. Permittee shall commence construction of the permitted
activities or provide evidence of substantial progress within eighteen (18) months from
the effective date of this permit, i.e. recordation date.

15 **G-4 CONDITION PRIORITY:**

16 The Project shall be constructed and operated as described in the Conditional Use
17 Permit application, and as specified in these conditions.

18 **G-5 INDEMNIFICATION:**

19 As a condition of this permit, Permittee agrees to defend, indemnify, hold harmless, and
20 release the County, its agents, officers, attorneys, and employees from any claim, action,
21 or proceeding brought against any of them, the purpose of which is to attack, set aside,
22 void, or annul the permit or adoption of the environmental document which accompanies
23 it. This indemnification obligation shall include, but not be limited to, damages, costs,
24 expenses, attorneys fees, or expert witness fees that may be asserted by any person or
25 entity, including the Permittee, arising out of or in connection with the approval of this
permit, whether there is concurrent, passive or active negligence on the part of the
County, its agents, officers, attorneys, or employees. This indemnification shall include
Permittee's actions involved in construction, operation or abandonment of the permitted
activities.

26 **G-6 INSURANCE:**

27 The Permittee shall secure and maintain liability in tort and property damage, insurance
28 at a minimum of \$1,000,000 or proof of financial responsibility to protect persons or

1 property from injury or damage caused in any way by construction and/or operation of the
2 permitted facilities.

3 The Permittee shall require that proper Workers' Compensation insurance cover all
4 laborers working on such facilities, e.g. during construction and maintenance, as required
5 by the State of California. The Permittee shall also secure liability insurance and such
6 other insurance as may be required by the State and/or Federal Law.

7 Evidence of such insurance shall be provided to the County prior to commencement of
8 any activities authorized by this permit, e.g. a Certificate of Insurance is to be provided to
9 the Planning and Development Services Department by the insurance carrier and said
10 insurance and certificate shall be kept current for the life of the permitted project.
11 Certificate(s) of insurance shall be sent directly to the Planning and Development
12 Services Department by the insurance carrier and shall name the Department as a
13 recipient of both renewal and cancellation notices.

10 **G-7 INSPECTION AND RIGHT OF ENTRY:**

11 The County reserves the right to enter the premises to make appropriate inspection(s)
12 and to determine if the condition(s) of this permit are complied with. The owner or
13 operator shall allow authorized County representative(s) access upon the presentation of
14 credentials and other documents as may be required by law to:

15 (a) Enter at reasonable times upon the owner's or operator's premises where
16 the permitted facilities are located, or where records must be kept under the conditions
17 of the permit;

18 (b) Have access to and copy, at reasonable times, any records that must be
19 kept under the conditions of the permit;

20 (c) Inspect at reasonable times any facilities, equipment, or operations
21 regulated or required under the permit.

19 **G-8 SEVERABILITY:**

20 Should any condition(s) of this permit be determined by a Court or other agency with
21 proper jurisdiction to be invalid for any reason, such determination shall not invalidate the
22 remaining provision(s) of this permit.

23 **G-9 PROVISION TO RUN WITH THE LAND/PROJECT:**

24 The provisions of this project are to run with the land/project and shall bind the current
25 and future owner(s), successor(s)-in-interest, assignee(s) and/or transferee(s) of said
26 project. Permittee shall not without prior notification to the Planning and Development
27 Services Department assign, sell, transfer, or grant control of project or any right or
28 privilege therein. The Permittee shall provide a minimum of sixty (60) days written notice
prior to such proposed transfer becoming effective.

1 **G-10 TIME LIMIT:**

2 Unless otherwise specified within the specific conditions, this permit shall be limited to a
3 maximum of thirty (30) years from the recordation of the CUP. The CUP may be
4 extended for successive thirty (30) year period by the Planning Director upon a finding by
5 the Planning and Development Services Department that the project is in compliance
6 with all conditions of the CUP as stated herein and any applicable Land Use regulation of
7 the County of Imperial. If an extension is necessary, the Permittee shall file a written
8 extension request at least sixty (60) days prior to the expiration of the Permit. Such an
9 extension request shall include the appropriate extension fee, pursuant to the Land Use
10 Ordinance, Title 9, Division 9, Section 90901.03 et. seq., General Planning fees. If the
11 original approval was granted by the Planning Commission and/or the Board of
12 Supervisors, such an extension shall only be considered by the approving body, after a
13 noticed public hearing. Nothing stated or implied within this permit shall constitute a
14 guarantee that an extension will be granted. An extension may not be granted if the
15 project is in violation of any one or all of the conditions or if there is a history of non-
16 compliance with the permit conditions.

11 **G-11 COST:**

12 The Permittee shall pay any and all amounts determined by the County Planning and
13 Development Services Department to defray any and all cost(s) for the review of
14 geothermal studies/reports, field investigations, subsidence/seismicity monitoring,
15 provisions for geothermal waste services, and other activities directly related to the
16 enforcement/monitoring for compliance of this Conditional Use Permit, County Ordinance
17 or any other applicable law as provided in the Land Use Ordinance, Section 90901.03 et.
18 seq., General Planning fees. All County Departments, directly involved in the
19 monitoring/enforcement of this project may bill Permittee under this provision, however
20 said billing shall only be through and with the approval of the Planning and Development
21 Services Department.

18 **G-12 REPORTS/INFORMATION:**

19 If requested by the Planning Director, Permittee shall provide any such
20 documentation/report as necessary to ascertain compliance with the Conditional Use
21 Permit. The format, content and supporting documentation shall be as required by the
22 Planning Director.

22 **G-13 DEFINITIONS:**

23 In the event of a dispute the meaning(s) or the intent of any word(s), phrase(s) and/or
24 conditions or sections herein shall be determined by the Imperial County Planning
25 Commission. Their determination shall be final unless an appeal is made to the County
26 Board of Supervisors within the required time, i.e. ten (10) calendar days, pursuant to the
27 Land Use Ordinance, Title 9, Division 1, Chapter 4, Section 90104.05, *Appeal from*
28 *Decision.*

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G-14 MINOR AMENDMENTS:

The Planning Director may approve minor modifications to the permit to accommodate minor changes or modifications to the design, construction, and/or operation of the project provided said changes are necessary for the project to meet other laws, regulations, codes, or conditions of the CUP and provided further, that such changes will not result in any additional environmental impacts.

G-15 SPECIFICITY:

The issuance of this permit does not authorize the Permittee to construct or operate the project in violation of any state, federal, local law nor beyond the specified boundaries of the project as shown the application/project description/permit, nor shall this permit allow any accessory or ancillary use not specified herein. This permit does not provide any prescriptive right or use to the Permittee for future addition and or modifications to the project.

G-16 NON-COMPLIANCE (ENFORCEMENT & TERMINATION):

Should the Permittee violate any condition herein, the County shall give notice of such violation. If Permittee does not act to correct the identified violation and, after having given reasonable notice and opportunity, e.g. typically at least thirty (30) days, the County may revoke the permit.

(a) If the Planning Commission finds and determines that the Permittee or successor-in-interest has not complied with the terms and conditions of the CUP, or cannot comply with the terms and conditions of the CUP, or the Planning Commission determines that the permitted activities constitute a public nuisance, the Planning Director shall provide Permittee with notice and a reasonable opportunity to comply with the enforcement or abatement order;

(b) If after receipt of the order, (1) Permittee fails to comply, and/or (2) Permittee cannot comply with the conditions set forth in the CUP, then the matter shall be referred to the Planning Commission for permit modification suspension, or termination, or to the appropriate prosecuting authority.

G-17 GENERAL WELFARE:

All construction of the project shall be conducted with consistency with all laws, conditions, adopted County policies, plans and the application so that the project will be in harmony with the area and not conflict with the public health, safety, comfort, convenience, and general welfare.

G-18 PERMITS OF OTHER AGENCIES INCORPORATED:

Permits granted by other governmental agencies in connection with the Project are incorporated herein by reference. The County reserves the right to apply conditions of

1 those permits, as the County deems appropriate; provided that enforcement of a permit
2 granted by another agency shall require concurrence by that agency.

3 **G-19 HEALTH HAZARD:**

4 If the County Health Officer determines that a significant health hazard exists to the
5 public, the Health Officer may require appropriate measures and the Permittee shall
6 implement such measures to mitigate the health hazard. If the hazard to the public is
7 determined to be imminent, such measures may be imposed immediately and may
8 include temporary suspension of permitted activities, the measures imposed by the
9 County Health Officer shall not prohibit the Permittee from requesting a special Planning
10 Commission meeting, provided the Permittee bears all related costs.

11 **G-20 APPROVALS AND CONDITIONS SUBSEQUENT TO GRANTING PERMIT:**

12 Permittee acceptance of this permit shall be deemed to constitute agreement with the
13 terms and conditions contained herein. Where a requirement is imposed in this permit
14 that Permittee conduct a monitoring program, and where the County has reserved the
15 right to impose or modify conditions with which the Permittee must comply based on data
16 obtained therefrom, or where Permittee is required to prepare specific plans for County
17 approval and disagreement arises, the Permittee, operator and/or agent, the Planning
18 Director or other affected party, to be determined by the Planning Director, may request
19 that a hearing be conducted before the Planning Commission whereby they may state
20 the requirements which will implement the applicable conditions as intended herein.
21 Upon receipt of a request, the Planning Commission shall conduct a hearing and make a
22 written determination. The Planning Commission may request support and advice from a
23 technical advisory committee. Failure to take any action shall constitute endorsement of
24 staff's determination.

25 **G-21 COMPLIANCE WITH COUNTY STANDARDS:**

26 The planning, drilling, and production standards set forth in the County's
27 Geothermal/Alternative Energy and Transmission Element shall be complied with, except
28 as may be modified by more specific or restrictive conditions of this permit.

G-22 OPERATIONS:

All operations shall be conducted under the direction of a responsible agent. The name
and telephone number of this individual shall be provided to the County Public Works
Department and the Planning and Development Services Department. This agent shall
ensure that appropriate personnel and equipment shall be available to respond to on-site
emergencies.

1 **SITE SPECIFIC CONDITIONS:**

2 **S-1 AUTHORIZED SCOPE OF ACTIVITIES:**

3 The Permittee is authorized to construct and operate the following facilities in compliance
4 with the County's General Plan, Geothermal/Alternative Energy and Transmission
5 Element, Land Use Ordinance, and all other applicable local, state, and federal laws,
6 ordinances, regulations and standards:

- 7 (a) The North Brawley Geothermal 49.9 MW net binary power plant consists of six
8 (6) Ormat Energy Converters (OEC Units 1 through 6) with vaporizers,
9 turbines, generators, condensers, preheaters, pumps and piping, motive fluid
10 storage, a motive fluid vapor recovery system, two cooling towers with 8-10
11 cells each, substation, approximately a 250-foot transmission line interconnect
12 and related ancillary equipment;
- 13 (b) A control room, maintenance shop and other facilities located at the power
14 plant site;
- 15 (c) Twenty to 26 (6 may be production or injection) production wells averaging
16 3,000 feet deep, including four of the six exploration wells, with associated
17 pumps, piping, electrical and other related ancillary equipment;
- 18 (d) Fourteen to 20 (6 may be production or injection) injection wells, including two
19 of the six exploration wells, averaging 3,000 feet deep with associated pumps,
20 piping, electrical and other related ancillary equipment;
- 21 (e) Piping from production wells to the power plant and from the power plant to
22 individual injection wells;
- 23 (f) Blowdown(s) wells at the power plant side for cooler tower blowdown;
- 24 (g) Pumps, tanks, valves, controls, flow monitoring and other necessary
25 appurtenances to the above wells and pipelines;
- 26 (h) Maintenance of the production and injection wells cited above;
- 27 (i) Piping, canals or ditches and pumps to bring water from the IID Canal to the
28 power plant; and,
- (j) Transmission line to the interconnection to the IID system.

Except as specifically authorized in this permit, expanding the geothermal power plant
beyond 49.9 MW and/or supplemental activities requiring additional major equipment or
facilities shall require separate permits.

1 The County, in issuing this permit, in no way assures or otherwise vests any right, with
2 respect to the issuance of a permit(s) for supplemental activities and Permittee shall also
3 comply with all applicable geothermal standards in the Land Use Ordinance.

4 **S-2 AIR QUALITY AND DUST EMISSIONS:**

5 The Permittee shall comply with the Imperial County Air Pollution Control District's
6 (ICAPCD) air-monitoring criteria for PM-10 to control dust or other emissions, including
7 Fugitive Dust Control conditions (Rule 800) under the new source review rule. All fugitive
8 dust emissions shall be controlled by watering, clean gravel, or application of soil
9 stabilizers or oil to the plant site. The Permittee shall obtain an Authority to Construct
10 and the Permit to Operate prior to any construction and operation of the plant.

11 **S-3 AESTHETICS:**

12 Due to potential aesthetics impacts to adjacent sensitive receptors, the following
13 mitigation measures shall apply:

14 **Mitigation Measures:**

- 15 (a) A landscaping plan shall be submitted to the Planning and Development
16 Services Department for review and approval prior to the issuance of any
17 building permits.
- 18 (b) All landscaping, in the form of trees, shrubs, and groundcover, must be
19 planted at the main entrance to the power plant and around the offices and
20 parking area of the power plant. Trees must be planted along the perimeter
21 of the project site abutting Hovley Road and all landscaped areas must be
22 permanently maintained in a neat and viable condition. With this mitigation
23 measure, the proposed power plant would not substantially degrade the
24 existing visual character or quality of the site and its surroundings.
- 25 (c) Project light sources during drilling and flow-testing be confined to the drill
26 rig and other operational areas as necessary for safety and that the light
27 from the drill site during drilling and flow testing be focused downwards to
28 prevent glare onto adjoining properties and roadways.
- (d) All exterior light fixtures shall be arranged and shrouded or down-shielded
so as to keep light away from adjoining properties and roadways. With
these mitigation measures, the project would not create a new source of
substantial light or glare which would adversely affect day or nighttime
views in the area.

29 **S-4 AGRICULTURE:**

30 Due to surrounding agricultural practices, the following mitigation measures apply:

31 **Mitigation Measures:**

- 1
- 2 (a) All pipelines shall be placed along existing road rights-of-way and/or IID
- 3 canals/drains to the extent feasible in order to reduce the amount of
- 4 agricultural land taken out of production or impacted by the project.
- 5 (b) The project's disturbed lands be returned to agricultural use (or use
- 6 compatible with surrounding land uses) once the power plant and wells are
- 7 abandoned, the pipelines removed, and the well pads reclaimed.
- 8 (c) The Permittee establish and maintain a weed abatement program at the
- 9 plant site to keep the site free of weeds and their seeds, to avoid impacts to
- 10 surrounding agricultural lands.

11

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13 **S-5 AIR QUALITY:**

14 The Permittee shall comply with the Imperial County Air Pollution Control District's

15 (ICAPCD) air-monitoring criteria for PM-10 to control dust or other emissions, including

16 Fugitive Dust Control conditions (Rule 800) under the new source review rule. All fugitive

17 dust emissions shall be controlled by watering, clean gravel, or application of soil

18 stabilizers or oil to the plant site. The Permittee shall obtain an "Authority to Construct"

19 and the "Permit to Operate" prior to any construction and operation of the power plant.

20 Also, the permits would require the Permittee to comply with all applicable federal, state

21 and local requirements for controlling air pollutant emissions. Thus, the project would not

22 be authorized to construct or operate if it were to violate any air quality standard or

23 contribute substantially to an existing or projected air quality violation.

24

25 **S-6 ARCHAEOLOGICAL, CULTURAL & PALEONTOLOGICAL RESOURCES:**

26 If any unusual specimens of bone, stone, or ceramic are discovered during grading,

27 well pad, pipeline construction of the permitted facilities, all construction affecting

28 the discovery site, shall cease until a qualified Cultural Resource archaeologist

retained by the Permittee and approved by the Quechan Tribe, Torres-Martinez

Tribe, and/or the County, reviews the specimens. The recommendations of the

approved Cultural Resource archaeologist shall be complied with prior to resuming

such activities.

29

30 **S-7 BIOLOGICAL RESOURCES:**

31 The Permittee shall coordinate with the U.S. Fish and Wildlife Service (USF&WS) and the

32 California Department of Fish and Game (CDF&G) for any preparation, implementation,

33 and monitoring activities deemed necessary for the protection of nesting birds and the

34 Burrowing Owl at the relocated site as follows:

35 **Mitigation Measures:**

- 36 (a) Permittee shall hire a qualified biologist to conduct a pre-construction survey
- 37 (within three days prior to work in the area or 30 days for Burrowing Owl) to determine
- 38

1 the presence or absence of active nests within or adjacent to the project site to avoid the
2 nesting of breeding migratory birds or Burrowing Owls.

3 (b) If not breeding or nesting activities are detected within 200 feet (Burrowing
4 Owl: 160 feet (September through January) or 250 feet (February through August) of
the proposed work area, construction activities may proceed.

5 (c) If breeding/nesting activity is confirmed, work activities within 200 feet of the
6 active nest shall be delayed until the young birds have fledged and left the nest.

7 (d) All Burrowing Owls observed were off-site. They will be protected by a berm
8 that has been established by dredging of the Spruce 3 Drain. There is a separation of
approximately 187 feet which, with the berm, will mitigate any effect of construction on
9 the plant site.

10 (e) Construction foremen should receive Burrowing Owl Worker's Training.

11 (f) No construction traffic to north of Spruce 3 Drain.

12 **S-8 BRINE CHEMISTRY:**

13 Permittee shall conduct brine chemistry tests which shall include, but not be limited to,
14 analysis for hydrogen sulfide, mercury, arsenic, fluoride, boron, ammonia, strontium, iron,
15 zinc, barium, lithium, lead, copper, chromium, and radon-222. The results of such tests
shall be provided by the County upon request. To the extent information contained in test
16 results are proprietary, such information shall not be released to the public.

17 **S-9 CONSTRUCTION STANDARDS:**

18 The plant and other permitted facilities shall be built in accordance with the County
19 Building Code requirement applicable to "Seismic Zone 4". All structures and facilities
20 shall be designed in accordance with the publication entitled "Recommended Lateral
Force Requirements and Commentary by the Structural Engineers Association of
21 California". The structural components of the plant and other permitted facilities shall be
reviewed by the Building Official/Planning Director. Building permits shall be procured for
the Project from the County prior to commencement of any construction of the project.

22 Flood protection improvements for the plant area shall meet Federal Emergency
23 Management Agency design specifications and shall be submitted for approval to the
24 Planning and Development Services Department and shall be constructed and
maintained by Permittee as approved.

25 **S-10 DRIFT:**

26 Permittee shall implement a program to minimize cooling water drift. The cooling tower
27 maximum drift rate shall be 0.0005%. Periodic monitoring shall be conducted to detect
boron, biocides, or other toxic elements and take remedial steps to keep such elements
28 below the permitted levels.

1
2 **S-11 ELECTRICAL TRANSMISSION:**

3
4 The power produced and sold will pass from the plant onto the Imperial Irrigation District
5 (IID) 92kV line through a new electrical transmission line to be constructed, owned, and
6 operated by the IID.

7 **S-12 EMERGENCY RESPONSE PLAN:**

- 8 (a) An Emergency Response Plan shall be prepared and maintained for the
9 project covering possible emergencies, e.g. blow-outs, major fluid spills,
10 impacts due to earthquakes, and other foreseeable accidents and
11 emergencies. The plans shall be prepared in consultation with the County,
12 CDOGGR, RWQCB, local emergency service agencies, public utilities, and
13 other state agencies as appropriate and shall include information useful in
14 combating the emergencies. The plan shall be available on-site, and
15 provided to agencies responsible for preparing for and addressing
16 emergencies, on request. At all times, there shall be at least one employee
17 "on call", i.e., available to respond to an emergency by reaching the facility
18 within a short period of time, with the responsibility of coordinating all
19 emergency response measures.

20 The Emergency Coordinator shall be thoroughly familiar with all aspects of
21 the Emergency Response Plan and have the authority to commit the
22 resources needed to carry out the contingency plan. Adequate personnel
23 and equipment shall be available to respond to emergencies and to insure
24 compliance with the conditions of the permit, to include appropriate first aid
25 provisions during project construction and operation with appropriate first
26 aid training for project employees and implement all worker safety and fire
27 protection programs and plans;

- 28 (b) A Hazardous Materials Business Plan shall be prepared and be submitted
to the Certified Unified Program Agency (Imperial Hazardous
Materials/Waste Unit, Calexico, California) and shall be maintained by the
Permittee;
- (c) The Permittee shall meet all NFPA requirements and also submit an
Engineer-certified (California-licensed Engineer) fire suppression/protection
plan to the Imperial County Fire/OES Department for review and approval;
- (d) Permittee shall comply with all the applicable conditions of the letter from
the County Fire/OES Department, or as may be modified by mutual
agreement of the Permittee and Fire/OES, prior to the issuance of a
building permit for the power plant.

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S-13 FIRST AID:

Appropriate first aid provisions for project operations shall be made for emergency response during project construction and operation with appropriate first aid training for project employees. During construction, drilling, testing, clean-out and work over, a member of each working crew shall be trained in basic first aid and supplied with necessary medical equipment to respond to emergencies as provided for in the Emergency Response Plan required above.

S-14 GEOTECHNICAL:

Geotechnical investigations of soil characteristics affecting the project shall be conducted by qualified people at the Permittee's expense. The geotechnical report prepared shall be made available to the County on request.

S-15 GEOLOGIC HAZARDS:

No structure meant to be, or which actually is, regularly, habitually, or primarily, occupied by humans shall be placed across the trace of an active fault. Further, no such structure shall be placed within fifty (50) feet of the trace of an active fault, nor anywhere within a seismic special studies zone, unless a geologic report, satisfactory to the State Geologist, is prepared and shows that no undue hazard would be created by construction or placement of the structure.

Subsidence Mitigation Measures:

- (a) Permittee shall participate in the County's subsidence detection program, and in connection therewith, submit a plan for Public Works Department approval, showing proposed locations of benchmark monuments. Monuments shall connect with the County's geothermal subsidence detection network. Benchmarks installed shall conform to County standards. Surveying shall be performed to National Geodetic Survey standards and all field surveying procedures shall conform with such standards.
- (b) Permittee shall perform surveying on an annual basis as required by the Director of Public Works, except the Director may require such surveying at shorter intervals if he deems it necessary. All work shall be performed under the supervision of a person licensed to practice surveying in California.
- (c) All field surveying data (such as forms and instrument checks), along with an adjustment of said data and analysis, all in conformity with the National Geodetic Survey standards, shall be submitted for review and approval to the Department of Public Works within two months of completion of field work.
- (d) If the Department of Public Works determines good cause exists to require additional surveying and analysis or additional subsurface data, the County

1 reserves the right to require such work to be accomplished at the expense
2 of the Permittee. The County further reserves the right, with Permittee's
3 input, to designate the consultant or firm to accomplish the work.
Proprietary information shall not be released to the public.

4 **S-16 HAZARDS & HAZARDOUS MATERIALS:**

5 A Risk Management Plan/CalARP Program Plan (RMP) shall be prepared for the project
6 pursuant to these regulations will describe the methods of delivery, storage, transfer, use,
7 and recovery of isopentane and additional safety measures to reduce the risk of damage
8 from release of this flammable substance. The RMP will include the detailed
9 specifications for the safe handling of isopentane and describe the training programs for
10 employees, operators, emergency responders, and contractors on site. It also will
11 summarize the incident investigations, compliance audits, management of change
procedures, and pre-startup reviews for isopentane. The project will also have an
Emergency Response Plan in place before start up that provides for notification of the
public, evacuation of the site, and procedures to be undertaken in the event of an
accidental fire or release of isopentane.

12 **S-17 NOISE:**

13 The power plant shall be equipped with noise control measures shall include, but are not
14 limited to, the following:

- 15 (a) Between October 1 and March 1, all project activities within 1,000 feet of
16 the New River shall conform to the Open Space curve of the Class II noise
17 standards. No well drilling or well testing shall take place within this area
from October 1 to March 1;
- 18 (b) Diesel equipment used for drilling within 1,000 feet of any residence shall
19 have hospital-type mufflers. Well venting and testing at these wells shall be
accompanied by the use of an effective muffling device or "silencer";
- 20 (c) Noise from the non-condensable gas vent stack shall be mitigated with a
21 commercial blowoff silencer. The turbine/generator and the condenser/air
22 ejector shall be enclosed or shielded to reduce noise. Any hydroblaster
used in de-scaling operations shall be enclosed in a building or a complete
noise-attenuating housing;
- 23 (d) Heavy truck traffic, well site preparation, and pipe stacking shall be limited
24 to the hours of 7:00 a.m. and 7:00 p.m. for any wells within 1,000 feet of
any residence. When a well drilling rig and other large equipment is being
25 brought to or from the site, temporary signs warning tourists, and flagmen,
26 as necessary, shall be used;
- 27 (e) Hydroblasters used in descaling operations when used within 1,000 feet of
28 a residence shall be limited to the hours of 7:00 a.m. to 7:00 p.m.;

- 1 (f) The Permittee may propose and the Planning Director may approve a
2 modification of the above measures.

3 **S-18 PROJECT DESIGN:**

4 The following shall be followed in project design:

- 5 (a) All expansion loops in fluid lines shall be horizontal except where requested
6 in writing by the owners of the surface rights within five hundred (500) feet
7 of a new or proposed expansion loop, or where the design constraints
8 require otherwise;
- 9 (b) Marking and lighting of drill rigs and permanent facilities shall be maintained
10 in accordance with Federal Aviation Administration regulations and
11 Permittee shall use pile driver shield enclosures on all pile driving
12 equipment to contain noise created by pile drivers during construction of the
13 plant site and well pad areas;
- 14 (c) On-site parking shall be provided for all employees, customers, clients, and
15 visitors. All facility roads and parking areas shall be constructed and
16 surfaced to County standards;
- 17 (d) Shrubs, trees and ground cover shall be planted and maintained to
18 compliment the appearance of the project, in accordance with a
19 landscaping plan approved by the Planning Director;
- 20 (e) Permittee shall submit any requested architectural and landscaping plans
21 for the facilities to the Planning Director and the Director shall not
22 unreasonably withhold approval of any required plans;
- 23 (f) All lights shall be directed or shielded to confine any direct rays to the
24 relocated plant site, and shall be muted to the maximum extent consistent
25 with safety and operational necessity specified by local, state and federal
26 Occupational Safety and Health Administration regulations;
- 27 (g) The location of new power pole lines adjacent to County roads shall be
28 reviewed and approved by the Public Works Department and the Imperial
Irrigation District prior to construction/installation of the power poles and be
equipped with bird diverters as deemed necessary;
- (h) The Planning Director may authorize, as requested in writing by Permittee,
minor relocation of the plant site and its internal components, well sites,
pipelines, and other minor adjustments to insure that the facilities comply
with the conditions of this permit and those required by other governmental
agencies.

S-19 PROTECTION OF WILDLIFE:

1 Measures approved by the Planning Director shall be employed to discourage or prevent
2 wildlife and avian entry into project brine ponds at the plant site. Any well cellars shall be
3 designed to prevent wildlife entry and entrapment. Any required pipelines for the project
shall be constructed so as not to become a barrier to wildlife movement.

4 **S-20 REPORTING:**

5 The Permittee shall furnish to the County, within a reasonable time, any relevant
6 reports/information which the County requires for monitoring purposes to determine
7 whether cause exists for revoking this permit, or to determine compliance with this permit,
8 i.e. relevant reports are those defined within this permit and/or requested by the County.
The Permittee shall submit all required reports to the Planning Director, Planning and
Development Services Department, 801 Main Street, El Centro, CA 92243.

9 **S-21 INDUCED SEISMICITY:**

10 Permittee shall participate in the County's seismic monitoring program, and in connection
11 therewith, submit a plan for Public Works Department approval, and shall implement the
12 plan as approved. If evidence of detrimental seismicity induced by project operations at
13 the plant site is indicated, changes in operations, including possible cessation of
operations, may be ordered by the Department of Public Works after consultation with the
California Department of Oil, Gas and Geothermal Resources (CDOGGR) and Permittee.

14 **S-22 SYSTEM SHUT DOWN AND SITE ABANDONMENT:**

15 The Permittee shall prepare and implement a plan for when the operation of the plant site
16 and other permitted facilities herein authorized has ceased, that all facilities shall be
17 dismantled, and the land involved be made compatible with the surrounding uses, or as
requested by the landowner and as agreed to by the County Planning Director.

18 A Bond, Letter of Credit, or other acceptable surety, or other forms of security acceptable
19 to Imperial County, in the amount of \$1,000,000, in addition to any amount set by the
20 California Division of Oil, Gas and Geothermal Resources, shall be filed with the County
21 that guarantees restoration of the land at the plant site to its condition prior to
development. Upon completion of such site restoration, the Bond (or other surety) shall
be released by the County.

22 **S-23 REINJECTION:**

23 The plant shall inject fluids equivalent to 100% of produced brine fluids by weight on an
24 annual basis back into the reservoir subject to the requirements of CDOGGR. If the
25 CDOGGR does not approve this injection rate and orders another, Permittee shall modify
this injection rate.

26 If the County Director of Public Works, or the CDOGGR, detects detrimental subsidence,
27 or detrimental seismicity, loss of reservoir pressure, or other detriments attributable to the
28 project at the plant site, corrective measures may be ordered by the County. Corrective
measures may include, but are not limited to, a change in production/injection rates,

1 deeper injection wells, re-leveling of affected areas, or reduction or total cessation of
2 geothermal activities.

3 **S-24 SPILLS AND RUNOFF:**

4 The site shall be designed and constructed to prevent spills from endangering adjacent
5 properties and waterways, and to prevent runoff from any source being channeled or
6 directed in an unnatural way so as to cause erosion, siltation, or other detriments. A
7 system of pressure and flow sensing devices and regular inspection and monitoring of all
8 lines, capable of detecting leaks and spills, shall be instituted and maintained. Blowout
9 prevention equipment shall be used in accordance with the requirements of CDOGGR.
10 The site shall be graded and constructed so that all spills will drain into the brine pond
11 with a plan for diverting birds, in the case of an emergency, shall be prepared in
12 coordination with the U.S. Fish and Wildlife Service.

13 **S-25 MAINTENANCE OF WATER QUALITY:**

14 A water quality monitoring program, acceptable to the Regional Water Quality Control
15 Board (RWQCB) shall be instituted and maintained for the site. If injection fluids intrude
16 into shallow groundwater, a modification of the injection program may be ordered by the
17 County in consultation with RWQCB, CDOGGR and the Permittee. Any additional sumps
18 and holding ponds shall be constructed and maintained so that permeability does not
19 exceed 1×10^{-6} cm/sec.

20 The Permittee shall furnish a Grading and Drainage Study Plan to provide for property
21 grading and drainage control on the plant site, which shall also include prevention of
22 sedimentation or damage to off-site properties. The Study Plan shall be submitted to the
23 Department of Public Works for review and approval. The Permittee shall implement the
24 approved Plans. Employment of appropriate Storm Water Best Management Practices
25 (BMPs) shall be included.

26 **S-26 PUBLIC SERVICES:**

27 The Permittee shall install all fire suppression and fire control improvements of
28 types, sizes, and at locations specified by the Imperial County Fire/OES
Department. Plans for said improvements shall be reviewed and approved by the
County Fire/OES Department prior to installation.

An alternative emergency access driveway, at least 20-feet wide and surfaced for
all-weather conditions, and as approved by the Fire/OES Department, shall be
constructed.

S-27 TRAFFIC SAFETY:

The Permittee shall obtain all encroachment permits and consider traffic safety in
transporting equipment and materials to the relocated plant site and other permitted
facilities to include temporary signs warning motorists on adjacent roadways and flagmen
shall be used when equipment is being brought to and from the Project site.

1
2 (a) The Permittee shall coordinate the movement of any required oversize
3 loads on County roads with the DPW, on State Highways with CALTRANS as well
4 as the El Centro CHP office and such transportation of oversized equipment
5 should be minimized as much as possible;

6 (b) The Permittee shall be required to obtain any necessary rights-of-way on
7 property under the lease and control of the Permittee and to provide any
8 necessary road work on County roads, e.g. Hovley and/or Andre Roads, as
9 deemed necessary by the DPW;

10 (c) The Permittee shall coordinate with DPW for their requested dedication of
11 rights-of-way needed for adjacent County roads;

12 (d) The Permittee shall file for an encroachment permit for any work or
13 proposed work in the affected County road rights-of-way at the plant site;

14 (e) The Permittee shall coordinate the maintenance of any unpaved County
15 roads used for construction activities and obtain approvals from DPW;

16 (f) A transportation permit shall be required for heavy equipment and/or large
17 vehicles which impose greater than legal loads on riding surface, including
18 bridges.

19 **S-28 TRAFFIC STUDY:**

20 A traffic study for short-term construction and long term use of the project and
21 relocated site with suggested mitigations for all nearby road intersections as well as
22 road right-of-way was prepared, dated October 10, 2007, and subject to review and
23 approval of DPW that included the following mitigation measures:

24 **Mitigation Measures:**

25 (a) Construction of the pipeline system to serve the project will require that the
26 Permittee secure permits from the County of Imperial for the three (3)
27 Hovley Road crossings. These crossings can be constructed using open
28 cut and trench methods with proper traffic controls. The crossing of SR-111
at Andre Road shall require the approval of Caltrans and issuance of
necessary encroachment permit.

(b) The County of Imperial will require the Permittee to dedicate 42 feet of right-
of-way along Hovley Road. Improvements shall provide for a deceleration
and acceleration lane for the project's access without impacting the high
voltage power system and poles along the eastside of Hovley Road
adjacent to the project site;

(c) The County of Imperial shall also require the Permittee to provide 30 feet of
dedication along the project's northerly boundary for the future Andre Road;

1 The Permittee shall comply with the applicable requirements outlined within the letters
2 from the County Department of Public Works, dated August 29, 2007, as may be
3 modified by mutual agreement of the Permittee and the Public Works Department, prior
4 to the issuance of a building permit for the plant.

4 **S-29 WATER COURSE CROSSINGS:**

5 The Permittee shall provide one or more of the following techniques to decrease the
6 potential for spills on or near Imperial Irrigation District water courses, e.g. surface water
7 canals and/or drains, at the plant site as follows:

- 8 (a) Design considerations for piping should include factors such as metallurgy,
9 stress analysis, pipe wall thickness, limiting the use of mechanical connections
10 and protective coatings appropriate for the specific design application;
- 11 (b) Control logic and instrumentation shall be utilized to shut valves and stop
12 pumps;
- 13 (c) Design of facilities shall protect surface and groundwater, e.g. handling of
14 on-site drainage shall not adversely affect adjacent properties;
- 15 (d) Other spill prevention measures, proposed by the Permittee and approved
16 by the County shall be implemented.

15 **S-30 WATER AND WASTE DISPOSAL:**

16 The Permittee shall insure that any discharged wastes, liquid or solid, at the site shall be
17 disposed of in compliance with all appropriate local, state, and federal regulations, in
18 effect or subsequently duly-enacted, i.e. discharge of wastes into surface water shall
19 meet all requirements of the Regional Water Quality Control Board (National Pollution
20 Discharge Elimination System permit restrictions) and any solid wastes shall be disposed
21 of in an approved solid waste disposal site in accordance with County, state and federal
22 regulations in effect or subsequently duly-enacted. Nothing here is intended to keep
23 substances from being extracted from wastes for useful purposes as later applied for and
24 approved.

21 **S-31 ODORS:**

22 All harmful or noxious emissions and odors shall be controlled to insure that quantities of
23 air contaminants released do not exceed State standards, or constitute a public nuisance.

24 **S-32 PARTICIPATION IN GEOTHERMAL COMMITTEE:**

25 Permittee shall participate in the "Geothermal Industrial Committee".

26 **S-33 ACCEPTANCE:**

27 Acceptance of this permit shall be deemed to constitute agreement by Permittee with all
28 terms and conditions herein contained.

PERMITTEE NOTARIZATION

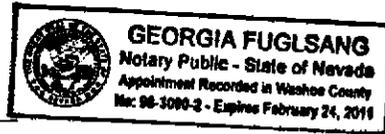
STATE OF Nevada

COUNTY OF Washoe } S.S.

On November 19, 2007 before me,
Georgia FUGLSANG a Notary Public in
and for said County and State, personally appeared
CONNIE STEHMAN, personally known to
me (or proved to me on the basis of satisfactory evidence) to be the person(s)
whose name(s) is/are subscribed to the within instrument and acknowledged to me
that he/she/they executed the same in his/her/their authorized capacity(ies), and
that by his/her/their signature(s) on the instrument the person(s), or the entity upon
behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal

Signature Georgia Fuglsang



ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to unauthorized document.

Title or Type of Document AGREEMENT FOR ADDITIONAL USE PERMIT #07-0017

Number of Pages 19 Date of Document 11-19-2007

Signer(s) Other Than Named Above Charlene L. Wardlow

Dated November 20, 2007

PERMITTEE NOTARIZATION

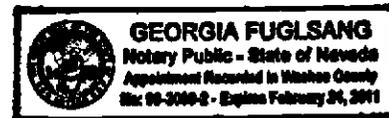
STATE OF Nevada

COUNTY OF Washoe } S.S.

On November 19, 2007 before me,
Georgia FUGLSANG a Notary Public in
and for said County and State, personally appeared
CHAD ZIMRON, personally known to
me (or proved to me on the basis of satisfactory evidence) to be the person(s)
whose name(s) is/are subscribed to the within instrument and acknowledged to me
that he/she/they executed the same in his/her/their authorized capacity(ies), and
that by his/her/their signature(s) on the instrument the person(s), or the entity upon
behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal

Signature Georgia Fuglsang



ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to unauthorized document.

Title or Type of Document AGREEMENT FOR CONDITIONAL USE PERMIT #07-0017

Number of Pages 19 Date of Document 11-19-2007

Signer(s) Other Than Named Above Charlene & Wardlow

Dated November 20, 2007

APPENDIX E
11-CAI-2

**LETTER FROM IMPERIAL COUNTY REGARDING
EAST BRAWLEY CONDITIONAL USE APPLICATION**



IMPERIAL COUNTY

PLANNING & DEVELOPMENT SERVICES

PLANNING / BUILDING INSPECTION / ECONOMIC DEVELOPMENT / PLANNING COMMISSION / A.L.U.C.

JURG HEUBERGER AICP, CEP, CBO
PLANNING & DEVELOPMENT SERVICES DIRECTOR

October 30, 2008

Charlene L. Wardlow
Director Project Development
Ormat Nevada Inc.
8225 Neil Road
Reno, NV 89511

RECEIVED

NOV 03 2008

ORMAT RENO OFFICE

RE: Conditional Use Permit #08-0023 (East Brawley Facility)
APN: 037-140-008-000

Charlene,

The Imperial County Planning & Development Services Department met with the Imperial Irrigation District (IID) today and discussed Ormat's proposed Geothermal Power Plant commonly referred to as the East Brawley Facility. In our discussion with the IID it was made clear that although IID staff has had one in contact with Ormat, said contact was preliminary and that no water availability contract has been drafted, nor is there one proposed in the near future. As you are well aware, availability of water is critical to the proposed Ormat East Brawley Facility and that absent a water contract with the IID this project is not feasible. That said, unless you have an alternative source of water we cannot proceed.

This Department finds that in order to proceed with the proposed Conditional Use Permit #08-0023 the availability of water will need to be resolved. Therefore, without the water issue resolved, in accordance with the Guidelines for California Environmental Quality Act, (California Code of Regulations, Title 14, Chapter 3, Section 15109) an "unreasonable delay" by the applicant has occurred, in the Department (Lead Agency for CEQA in Imperial County) is unable to complete the CEQA process. Therefore the Department hereby puts Conditional Use Permit #08-0023 on hold until such time that an executed water availability contract between the IID and Ormat is submitted to the Imperial County Planning & Development Services Department.

Additionally, all of the studies including the SB 610 Water supply Assessment previously requested by Department will need to be submitted prior to reactivation of the permitting process.

If you have any questions please contact me at (760) 482-4236 extension 4310 or e-mail me at Jurgheuberger@co.imperial.ca.us.

Sincerely,


Jurg Heuberger, AICP
Planning & Development
Services Director

CC: Darrell Gardner, Assistant Planning Director

CUP #08-0023

Files: 10.101, 10.102, 10.105

MSW\FJMS\APN FILES\037140\008\08-0023 project on hold 10 30 08 Finalized MS.doc

MAIN OFFICE: 801 MAIN ST., EL CENTRO, CA 92243
ECON. DEV. OFFICE: 836 MAIN ST., EL CENTRO, CA 92243

(760) 482-4236
(760) 482-4900

FAX: (760) 353-8338
FAX: (760) 337-8907

E-MAIL: planning@imperialcounty.net
(AN EQUAL OPPORTUNITY EMPLOYER)

APPENDIX F
11-CAI-2

**NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL IMPACT
REPORT FOR ORMAT, EAST BRAWLEY DEVELOPMENT PROJECT,
ORNI. 19, LLC.**

(MARCH 20, 2011)

NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR
ORMAT, EAST BRAWLEY DEVELOPMENT PROJECT, ORNI. 19, LLC.

NOTICE IS HEREBY GIVEN that the County of Imperial Planning and Development Services Department, as lead agency, is circulating for public review a Draft Environmental Impact Report (EIR) in accordance with the California Environmental Quality Act (CEQA) for the proposed ORMAT, East Brawley Geothermal Development Project, Orni 19, LLC.

Project Title: Draft Environmental Impact Report for ORMAT, East Brawley Geothermal Development Project, Orni 19, LLC. (SCH No. 2010061054).

Project Location: The southern boundary of the project is located north of the City of Brawley within their sphere of influence and north of Highway 111. The eastern boundary of the project is Dietrich Road and Rutherford Road is to the north. The site is comprised of parcel numbers 037-140-(006, 017, 011) -000.

Project Description: The project would construct a new 49.9 net megawatt binary power plant composed of six Ormat Energy Converters, an expanded geothermal well field beyond the six exploration wells, and pipelines to carry the geothermal brine to the power plant. Also to be constructed are pipelines to carry the cooled brine to injection wells, pipelines to distribute non-condensable gas from production wells to the power plant area and injection wells, an electrical transmission line to interconnect to the substation at the North Brawley 1 Geothermal Power Plant, and a water pipeline to bring water from the Imperial Irrigation District canal to the power plant for cooling water.

Anticipated Significant Effects: The EIR will analyze potential impacts associated with the following: Aesthetics; Agricultural Resources; Air Quality; Biological Resources; Cultural Resources; Cumulative Impacts; Geology/Soils; Greenhouse Gas Emissions/Climate Change; Growth-Inducing Impacts; Hazards/Hazardous Materials; Hydrology/Water Quality; Land Use/Planning; Noise; Public Services/Utilities; and, Transportation/Circulation.

Availability: The Draft EIR/EA can be reviewed at the following location: Imperial County Planning and Development Services Department, 801 Main Street, El Centro, CA 92243.

Comments: Written comments regarding the Draft EIR should be directed to Angelina Havens, Planner III, County of Imperial Planning and Development Services Department, 801 Main Street, El Centro, CA 92243 and must be received **no later than May 03, 2011** (public review period March 16, 2011, 2011 through May 03, 2011). A Final EIR incorporating public input will be prepared for consideration by the Imperial County Planning Commission and Board of Supervisors at a future public meeting. For environmental review information for this project, please contact Angelina Havens at (760) 482-4236, ext. 4984.

This notice was published in the Imperial Valley Press on March 20, 2011.

APPENDIX G
11-CAI-2

**WATER SUPPLY AGREEMENT
BETWEEN
IMPERIAL IRRIGATION DISTRICT
AND
ORMAT**

WATER SUPPLY AGREEMENT

The parties to this Water Supply Agreement ("Agreement"), entered into this 23rd day of ~~OCTOBER~~, 2008 ("Effective Date"), are IMPERIAL IRRIGATION DISTRICT, a California irrigation district (hereinafter referred to as "IID"), and ORNI 18, LLC, a wholly owned subsidiary of Ormat Nevada, Inc., a Delaware corporation (hereinafter referred to as "ORMAT").

1. INTRODUCTION:

1.1. ORMAT is currently undertaking development activities precedent to the construction and operation of a 49.9 MW geothermal power plant (hereinafter referred to as the "Project") located within the service area of the IID, Imperial County, California. The site of the proposed Project is approximately 24 acres ("Project Site") located within a 240-acre parcel defined as the Southeast corner of Section 17, T.13S.R.14E., of the S.B.B.M. and designated as Assessor's Parcel Number (APN) 037-130-40-01 of which a 216.1 acre (FSA) portion was served historically by Spruce Lateral 1 Gate 66.

1.2. The Project is more specifically described in, and will be constructed and operated by ORMAT in conformance with, Conditional Use Permit #07-0017 ("Conditional Use Permit") approved by the County of Imperial and recorded on November 27, 2007 as Document # 2007-044103 of the Official Records of Imperial County, California.

1.3. The County, as lead agency, assessed the environmental effects of the Project pursuant to the California Environmental Quality Act ("CEQA"), California Public Resources Code Sections 21000 et seq., and the CEQA Guidelines, 14 California Code of Regulations Sections 15000 et seq., and the County approved a Mitigated Negative Declaration ("MND") for the Project in November 2007.

1.4. The Board of Directors of the IID ("IID Board") is willing to make available up to 6,800 acre of water per calendar year for beneficial consumptive use by ORMAT in connection with the Project in accordance with the terms and conditions set forth in this Agreement.

1.5. This Agreement shall be contingent and effective upon: (i) approval by the IID Board of the Environmental Compliance Report and its findings prepared by IID dated September 22, 2008, (ii) approval by the IID Board of this Agreement, and (iii) execution of this Agreement by the parties.

2. DEFINITIONS:

For the purposes of this Agreement, except as otherwise expressly provided or unless the context otherwise requires, the following terms shall have the following meanings:

- 2.1. **Aggregate Requirement** – With respect to any given calendar year, a volume of water consisting of the aggregate of (i) the Historical Use Amount and (ii) the Replacement Water volume.
- 2.2. **Effective Date** – The date on which the conditions described in Section 1.5 have been satisfied.
- 2.3. **Equitable Distribution Plan** – The Equitable Distribution Plan approved by the IID Board and the Regulations relating thereto, or any additional or superseding regulations approved by the IID Board providing for a system of water allocation, as the same may be amended and in effect from time to time during the Term of this Agreement.
- 2.4. **Excess Requirement** – With respect to any given calendar year, the volume of water consumed by ORMAT for the Project for such year (i) greater than the Historical Use Amount but (ii) less than the Aggregate Requirement applicable to such year.
- 2.5. **Historical Use Amount** – A volume of water determined annually based on an average agricultural historical use rate of 5.7 acre-feet/acre per calendar year for the Project Site of up to 24 acres that is converted from agricultural to industrial use as a result of the project. The Historical Use Amount shall not exceed 137 acre-feet per calendar year and is subject to the terms of Section 8.1 including assignment of the right to receive water service from the landowner as described in Section 8.1.
- 2.6. **Imported Water** – A volume of water from a source other than IID's Colorado River entitlement brought into the IID conveyance system to satisfy all or a portion of the Project's Maximum Use Amount (as defined in Section 2.7) during the Term of this Agreement (as defined in Section 5). Any non-IID water introduced into the IID conveyance system shall be of comparable quality to that of existing Colorado River supplies, subject to IID approval, and require the execution of a separate delivery agreement with IID. IID's approval shall be subject to: (i) compliance with CEQA and all other governmental laws, ordinances, rules and regulations ("Laws") applicable to the provision of such Imported Water, and (ii) issuance of all governmental permits and approvals ("Permits") required therefore. ORMAT shall pay all costs of compliance with such Laws, issuance of such Permits, and satisfaction of all conditions and requirements attached thereto.
- 2.7. **Maximum Use Amount** – The maximum volume of water to be delivered by IID during any calendar year during the Term of this Agreement, which shall be used by ORMAT for the Project. The Maximum Use Amount shall be 6,800 acre-feet reduced by the amount of Replacement Water which ORMAT is required to provide for the applicable calendar year, as set forth on Exhibit A attached hereto and made a part hereof.

- 2.8. **Overrun Year** – A calendar year in which IID’s diversions from the Colorado River trigger a payback requirement by the U.S. Department of Interior under its adopted Inadvertent Overrun and Payback Policy.
- 2.9. **Replacement Water** – A volume of water to be provided by ORMAT, at its sole cost, for use in connection with the Project at the Project Site, commencing with the eleventh (11th) calendar year of the Term and continuing for the balance of the Term of this Agreement, as indicated on Exhibit A, which amount shall reduce the amount of water required to be supplied by IID for such years. This water shall be provided by ORMAT from Imported Water, or by a reduction in the Project’s water demand, or by measures implemented or funded by ORMAT within the District which conserve Colorado River water, subject to IID approval and outside the conservation measures identified and anticipated for the existing IID water conservation and transfer obligations, in an amount equal to the required Replacement Amount. The provision of any Replacement Water created by measures implemented by Ormat within the District is subject to IID approval, may require the execution of a separate delivery agreement with IID, and is subject to: (i) compliance with CEQA and all other governmental laws, ordinances, rules and (ii) issuance of all governmental permits and approvals (“Permits”) required therefore. ORMAT shall pay all costs of compliance with such Laws, issuance of such Permits, and satisfaction of all conditions and requirements attached thereto.

3. **DELIVERY:**

- 3.1. IID shall permit ORMAT to take delivery from the Spruce Canal or another location where otherwise agreed to in writing by the parties, such water as may be required by ORMAT for use in and incidental to the operation of the Project, and for no other purpose, in a total quantity not to exceed 6,800 acre-feet in any calendar year during the Term of this Agreement; provided, however, nothing in this Agreement shall be construed to require IID to modify or enlarge its existing canal system to make water available to ORMAT, and ORMAT shall not be entitled to take water at a rate which will deplete the supply available in the canal for other uses. ORMAT shall order water, up to the Maximum Use Amount, in accordance with IID’s Rules and Regulations for ordering water, as amended as of the date of ordering, in compliance with Sections 6 and 8 below. The right of ORMAT to use water for the Project hereunder is not cumulative from year to year during the Term; that is, if ORMAT does not use the full Maximum Use Amount in any calendar year, ORMAT has no right to add the unused amount to the Maximum Use Amount in any succeeding calendar year. Any unused portion of the Maximum Use Amount for any calendar year may be used by IID as it, in its sole discretion, shall determine.
- 3.2. Pursuant to IID Regulation No. 13, ORMAT is required to construct a facility to hold water of a minimum volume equal to six days (based on 24 hours) of use in accordance with the District policy of six-day canal cutouts for maintenance and construction. IID hereby agrees that as an alternative ORMAT shall have the

option to construct an extension of the existing delivery pipeline to the Westside Main Canal in lieu of constructing the on-site storage facility described in IID Regulation No. 13, subject to the following terms and conditions: (i) ORMAT shall deliver written notice to IID of whether it chooses to build the on-site storage facility or the extension of the existing delivery pipeline; (ii) ORMAT shall pay all costs of compliance with applicable Laws in connection with whichever structure is chosen, including CEQA compliance, issuance of all required Permits, and satisfaction of all conditions and requirements attached thereto; (iii) ORMAT, at its sole cost, shall construct, install, and maintain any structures, facilities or improvements necessary to store water in the storage facility or, if the extension of the existing delivery pipeline is chosen, any structures, facilities or improvements necessary to implement its retrieval of water from the Westside Main Canal, including a water metering device acceptable to IID at the connection with the canal that is annually calibrated and certified; and (iv) ORMAT shall complete construction of said storage facility or extension of the existing delivery pipeline and related facilities no later than 3 years from the Effective Date of this Agreement. IID may, without cost to IID, assist ORMAT to obtain any necessary easements, Permits or other rights to transport said water from the West Side Main canal to the Project and ORMAT may terminate this Agreement if it cannot reasonably obtain such Permits. ORMAT acknowledges and assumes all risks of water supply shortages, outages or use limitations due to operation and maintenance activities by IID, capacity limitations, or other infrastructure or field conditions that on-site storage or extension of the existing delivery pipeline to the West Side Main canal may have eliminated or reduced.

- 3.3. To the extent that IID receives an order or directive from a governmental authority having appropriate jurisdiction, reducing the volume of water available to IID from the Colorado River during all or any part of the Term of this Agreement, IID may reduce the Maximum Use Amount, as directed by the IID Board; provided however that in no event shall the ratio of (i) such reduction in the Maximum Use Amount to (ii) the total reduction of water available to IID from the Colorado River exceed the ratio of (a) the Maximum Use Amount to (b) the current total amount of water available to IID from the Colorado River for the otherwise applicable year during implementation of the Quantification Settlement Agreement and Related Agreements, as such available water is summarized on Exhibit B to the Colorado River Water Delivery Agreement among the IID, the United States Secretary of the Interior, and others. This reduction shall be separate from and in addition to any allocation authorized pursuant to the Equitable Distribution Plan.
- 3.4. If IID implements a water allocation program pursuant to the Equitable Distribution Plan during all or any part of the Term of this Agreement, IID shall have the right to apportion ORMAT's water as an Industrial User consistent with the Equitable Distribution Plan.

- 3.5. ORMAT understands and acknowledges that this Agreement does not require, and shall not be construed to require, IID to deliver any specific volume of water for the Project after termination of this Agreement.
- 3.6. During the Term of this Agreement, ORMAT shall implement Best Management Practices (BMPs), conservation measures or new technologies to reduce the Project's water demand from IID. The Replacement Water required in Section 3.7 may be provided, in whole or in part, by implementation of these BMPs and/or conservation technologies in connection with the Project at the Project Site.
- 3.7. During the Term of this Agreement, ORMAT shall provide Replacement Water in the amounts specified in Exhibit A for the applicable calendar year, which shall reduce the Project's water demand from IID for that year. ORMAT shall create Replacement Water by measures approved by IID and outside the conservation measures identified and anticipated for the existing IID water conservation and transfer obligations, in accordance with the schedule shown in Exhibit A. The requirement for ORMAT to provide Replacement Water during the Term of this Agreement will be delayed if water conservation projects are not identified through the Integrated Water Resources Management Plan by IID. Either party may request a status review of this Agreement annually.

4. DRAINAGE RIGHTS:

- 4.1. ORMAT has represented to IID that the Project will be designed as a zero discharge system and as a result ORMAT will not need drainage services that are typically provided to IID's industrial customers. ORMAT may be allowed to discharge, from time to time, occasional rain or storm water runoff to the appropriate IID drainage facility in accordance with IID Rules & Regulations.
- 4.2. Any discharge water shall be regulated by the Regional Water Quality Control Board (RWQCB). ORMAT shall comply with all NPDES and permitting requirements as necessary, including the implementation of appropriate BMPs.
- 4.3. A copy of all discharge records required under any RWQCB discharge permit shall also be submitted to the IID at the interval stated on the permit.

5. TERM:

- 5.1. The term of this Agreement ("Term") shall commence on the Effective Date and, unless sooner terminated as provided in this Agreement, shall terminate December 31, 2028.
- 5.2. In approving this Agreement, IID has relied upon the representation by ORMAT that the Project will be constructed and operated in conformance with the Conditional Use Permit described in Section 1.3. If the Conditional Use Permit is

terminated, or materially modified without IID's approval, this Agreement shall terminate.

6. REQUIREMENTS NOTICE:

6.1. ORMAT shall estimate the total quantity of water to be purchased by ORMAT on an annual basis, to reflect the anticipated water requirements for the Project. ORMAT shall, on or before September 1 of each year, provide IID with written notice of the approximate quantity of water to be purchased during each month of the following calendar year ("Quantity Notice Letter"). Such amount shall constitute a good faith estimate on the part of ORMAT, but shall not constitute a minimum or maximum quantity of water to be purchased during the specified period, except as provided in Section 6.2 below.

6.2. If IID has authorized implementation of a water allocation process in accordance with the Equitable Distribution Plan for any calendar year, then ORMAT shall be obligated to pay for the Maximum Use Amount during such calendar year. ORMAT shall provide IID with timely written notice on or before January 31 of each year if it intends to use less than the Maximum Use Amount to be delivered by IID for that year pursuant to Exhibit A. During such calendar year if so notified IID will limit water deliveries to the Project to this lesser volume, and ORMAT shall be billed for this revised volume.

7. PAYMENT/BILLING:

7.1. For the right to take and use water identified herein:

7.1.1. ORMAT shall pay a per acre-foot charge for water used by the Project at IID's industrial water rate, as amended from time to time, payable monthly.

7.1.2. In any Overrun Year, for water consumption above the Historical Use Amount per calendar year, ORMAT shall also be required to pay additional fees associated with its prorata share of IID's total cost to provide water for payback purposes, or obtain Imported Water in an equivalent volume to satisfy payback requirements. ORMAT's prorata share shall be based on its annual water use in the Overrun Year and shall not exceed ORMAT's Project's Excess Requirement or IID's total payback requirement for the Overrun Year. IID will issue a supplemental billing the year following the overrun year based on the projected cost of conservation measures to be implemented to generate conserved water for payback of an overrun.

7.1.3. In lieu of the obligation to fund payback obligations in Overrun Years for consumptive use above the Historical Use Amount pursuant to Section 7.1.2, ORMAT may utilize Imported Water to serve the consumptive use demands of the Project.

7.1.4. As additional consideration to IID, ORMAT shall pay to IID the amount of One Million Five Hundred Thousand Dollars (\$1,500,000), which Seven Hundred Fifty Thousand Dollars (\$750,000) shall be due and payable within thirty (30) days of the execution of this Agreement and prior to initial delivery of water to the Project with the balance due one (1) year from contract execution. IID shall use these monies to fund IID's upcoming Integrated Water Resources Management Plan (IWRMP) and implementation of any plan components as approved by the IID Board.

7.1.5. In the event that IID implements an allocation consistent with the Equitable Distribution Plan during all or any part of the Term of this Agreement, ORMAT shall make payments according to a schedule consistent with the Equitable Distribution Plan. In the event that IID adopts a rate schedule for industrial users in years that an allocation is triggered (consistent with the Equitable Distribution Plan), this Equitable Distribution rate schedule shall supersede IID's usual industrial rate and reflect costs of the assured water supply.

8. COMPLIANCE WITH LAWS, RULES AND REGULATIONS:

8.1. ORMAT shall be obligated to comply with the "Rules and Regulations Governing the Distribution and Use of Water" and the Equitable Distribution Plan (collectively, "Rules and Regulations") adopted by IID Board in their present form or as they may be amended hereafter. Prior to ordering any water in accordance with this Agreement, and continuing thereafter during the Term of this Agreement, ORMAT shall provide written authorization from the property owner to allow ORMAT to order water for the Project Site, in accordance with IID's standard procedure. Notwithstanding ORMAT's obligation to comply with said Rules and Regulations, in the event of any conflict or inconsistency between the provisions of this Agreement and said Rules and Regulations pertaining to ORMAT's payment obligation set forth in Section 7 of this Agreement, this Agreement shall govern.

8.2. ORMAT shall obtain and maintain in effect during the Term of this Agreement, all Permits required for construction and operation of the Project. ORMAT shall comply with all Laws applicable to the Project and the terms and conditions of all Permits.

9. GOVERNING LAW:

9.1. This Agreement shall be interpreted in accordance with the substantive and procedural laws of the State of California. All actions or proceedings arising in connection with this Agreement shall be tried and litigated exclusively in State court located in the County of Imperial, State of California and/or Federal court located in the County of San Diego or County of Imperial, State of California. The aforementioned choice of venue is mandatory, thereby precluding the possibility

of litigation between the parties with respect to or arising out of this Agreement in any jurisdiction other than that specified in this paragraph. Each party hereby waives any right it may have to assert the doctrine of forum non convenienc or a similar doctrine or to object to venue with respect to any proceeding brought in accordance with this paragraph, and stipulates that the State and Federal courts located in the Counties of Imperial and San Diego, respectively, California, shall have in personam jurisdiction and venue over each of them for the purpose of litigating any dispute or proceeding arising out of or related to this Agreement. Each party hereby authorizes service of process sufficient for personal jurisdiction in any action against it at the address and in the manner for the giving of notice as set forth in this Agreement.

10. BINDING OBLIGATIONS; ASSIGNMENT:

10.1. This Agreement shall be binding upon and inure to the benefit of the parties and their successors and assigns, subject to the limitations set forth in this Section 10. No party may assign or transfer its rights or obligations under this Agreement without the prior written consent of the other party hereto, except as permitted herein. Such consent shall not be unreasonably withheld. However, without prior consent, IID may assign its rights under this Agreement as security for any water conservation financing IID might obtain in carrying out this Agreement. ORMAT may, without prior consent, assign its rights to a lender, lessor, and/or trustee acting on behalf of a lender or lessor, or any other financing entity which acquires an interest in the Project (collectively "Financing Entities") in connection with any financing involving the Project. In the event of an assignment of ORMAT's rights hereunder to any Financing Entities, IID shall take such further actions and execute such documents as are reasonably requested by such Financing Entities to effectuate such assignment, provided that such agreement does not materially, adversely affect IID's rights and obligations hereunder.

Solely with respect to any Financing Entity which acquires an interest in this Agreement, and provided IID has received written notice from ORMAT of such interest and request, IID agrees to give written notice to such Financing Entity of any default by ORMAT under this Agreement and will afford such Financing Entities a reasonable period of time to commence appropriate action to cure such default, should they choose to do so; provided, however, that any monetary default by ORMAT must be cured by such Financing Entity within thirty (30) days after expiration of the sixty (60) day cure period available to ORMAT under Section 16.1(a) and shall include late payments and penalties as described in Section 15.1. In the event that this Agreement is terminated by reason of bankruptcy of any party, IID will, at the option of any Financing Entity, enter into a new contract with such Financing Entities or their successors or assigns, having terms similar to this Agreement.

Except for the assignment to a Financing Entity for security purposes described above, ORMAT may only assign its rights under this Agreement to an entity which:

(i) is the assignee of ORMAT's rights under the Conditional Use Permit described in Section 1.2; (ii) owns fee title to, or a leasehold interest in, the Project Site; and (iii) has been authorized by the property owner to order water for the Project in accordance with IID's standard procedures. No such assignment shall be effective until the delivery to IID of a written document providing for the assignment of ORMAT's rights under this Agreement, the assignee's assumption, for the benefit of IID, of ORMAT's obligations under this Agreement, and representations by the assignee comparable to those by ORMAT in Section 21.

11. NO THIRD PARTY RIGHTS:

11.1. Except as provided in Section 10, the parties do not intend to create rights and/or to grant remedies to any third party or others as a beneficiary of this Agreement or of any duty, covenant, obligation or undertaking established hereunder.

12. NO DEDICATION OF FACILITIES:

12.1. Any undertaking by one party to another party under any provision of this Agreement shall not constitute the dedication of the system or any portion thereof of the party to the public or to the other party, and it is understood and agreed that any such undertaking under any provision of this Agreement by a party shall cease upon the termination of its obligations hereunder.

13. NON-WAIVER:

13.1. None of the provisions of this Agreement shall be considered waived by any party except when such waiver is given in writing. The failure of any party to insist in anyone or more instances upon strict performance of any of the provisions of this Agreement or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provisions or their relinquishment of any such rights for the future, but the same shall continue and remain in full force and effect.

14. UNCONTROLLABLE FORCES:

14.1. No party shall be considered to be in default in the performance of any of its obligations under this Agreement when a failure of performance shall be due to an uncontrollable force. The term "Uncontrollable Force" shall mean any cause beyond the control of the party affected including, but not restricted to, flood, drought, earthquake, tornado, storm, fire, pestilence, lightning and any other natural catastrophe, epidemic, war, riot, civil disturbance or disobedience, strike, labor dispute, labor or material shortage, sabotage, acts, including restraining or enjoinder by proper authority, of civil or military authority (whether valid or invalid), inaction or non-action by or inability to obtain or keep the necessary authorizations or approvals from any governmental agency or authority, which by

exercise of due diligence such party could not reasonably have been expected to avoid and which by exercise of due diligence it has been unable to overcome; provided, however, that uncontrollable forces shall not include financial inability or economic conditions generally. Nothing contained herein shall be construed as to require a party to settle any strike or labor dispute in which it may be involved. Any party rendered unable to fulfill any of its obligations under this Agreement by reason of uncontrollable force shall give prompt written notice of such fact to the ~~other parties and shall exercise due diligence, and cooperate with any efforts of~~ such other parties, to remove such inability with all reasonable dispatch.

15. LATE PAYMENT PENALTY:

15.1. If ORMAT (solely with respect to the payments under Sections 7.1.1, 7.1.2, and 7.1.5) fails to pay any amount when due, an interest charge on the unpaid amount due based on the late payment charge percentage calculated by the Department of the Treasury and published quarterly in the Federal Register (but not less than 0.5% per month) shall be added on the first day following the due date and monthly thereafter until the payment, any penalty and interest are paid in full. Additionally, if any payment is not made within seven (7) business days after written notice is received by ORMAT, that such payment is overdue, a penalty of two percent (2%) of the amount due shall be added thereto. IID's remedies under this Section 15.1 shall be in addition to any remedies available to IID under Section 16 below.

16. TERMINATION:

16.1. If ORMAT breaches this Agreement, including failure to make payment when due or to provide Replacement Water as outlined in Exhibit A, IID shall have the following rights and remedies:

(a) If delivery charges for water used by the Project, or any other monetary amounts payable by ORMAT hereunder, are not paid within sixty (60) days after written notice is received by ORMAT and any Financing Entities (identified by notice to IID as described in Section 10.1), IID may suspend deliveries of water pursuant to this Agreement with respect to such Project, and such Project shall have no further rights to use water hereunder until and unless such default (plus penalty and interest) is fully cured within an additional six months. After such 6-month period, IID may terminate this Agreement with respect to such Project if such default is still outstanding. IID shall deliver written notice to ORMAT of its election to suspend deliveries and/or terminate this Agreement.

(b) IID may charge penalties and interest only in accordance with paragraph 16 above.

(c) In the event of a non-monetary default by ORMAT, or if any representation by ORMAT becomes false or materially misleading, IID may terminate this Agreement by written notice to ORMAT; provided, however, that IID has delivered written notice to ORMAT and any Financing Entities (identified by notice to IID as described in Section 10.1), and the default remains uncured after expiration of a thirty (30) day cure period, except that if the default is curable and reasonably requires additional time to cure, the cure period shall be extended for such reasonable time as long as ORMAT commences the cure within such 30-day period and diligently prosecutes such cure to completion thereafter.

(d) IID may institute any available and appropriate legal or equitable action to enforce the terms of this Agreement.

16.2. IID may use any or all of these rights and remedies in case of ORMAT's breach and if it selects one, shall not waive its right to select or use any other. IID acknowledges (and will accept) that any Financing Entities or other parties which acquire an interest in the Project may cure any breach of this Agreement within the time periods specified in Section 10.1 and 16.1, as applicable, and such cure shall be considered as full performance hereunder.

17. INDEMNIFICATION:

17.1. To the fullest extent permitted by law, ORMAT shall defend, indemnify and hold harmless IID, its employees, agents and officials, from any: liability; claims; suits or actions (including alternative dispute resolution); losses; expenses; fees; or costs of any kind, whether actual, alleged or threatened; administrative, and regulatory proceedings; and any other costs or expenses of any kind whatsoever, without restriction or limitation; so long as such things are in relation to, as a consequence of, arising out of, or in any way attributable actually, allegedly or implied, in whole or in part, to the performance of this Agreement and/or the construction and operation by ORMAT of any facilities for the delivery of water to the Project. All obligations under this provision are to be paid by ORMAT as they are incurred by IID.

Without affecting the rights of IID under any provision of this Agreement or this section, ORMAT shall not be required to indemnify and hold harmless IID as set forth above for liability attributable to the sole fault of IID, provided such sole fault is determined by agreement between the parties or the findings of a court of competent jurisdiction. This exception will apply only in instances where IID is shown to have been solely at fault and not in instances where ORMAT is partially at fault or in instances where the fault of IID accounts for only a percentage of the liability involved. In those instances, the obligation of ORMAT will be all inclusive and IID will be indemnified for all liability incurred, even though a percentage of the liability is attributable to conduct of IID.

ORMAT acknowledges that its obligation pursuant to this section extends to liability attributable to IID, if the liability is less than the sole fault of IID. However,

ORMAT has no obligation under this Agreement for liability proven in a court of competent jurisdiction or by written agreement between the parties to be the sole fault of IID.

The obligations of ORMAT under this or any other provision of this Agreement will not be limited by the provisions of any workers compensation act or similar act. ORMAT expressly waives its statutory immunity under such statutes or laws as to IID, its employees and officials.

ORMAT agrees to this indemnity provision and represents that it has been given an opportunity to take exception to all or any part of this, as well as all other provisions of the Agreement.

17.2. In the event of any legal action or proceeding instituted by a third party (i.e., neither IID nor ORMAT) challenging the validity and enforceability of this Agreement, the Project, or the CEQA compliance for this Agreement or the Project, the parties shall cooperate with each other in good faith to defend such action or proceeding; provided, however, that ORMAT shall indemnify, hold harmless and pay all reasonable costs for the defense of IID, including reasonable fees and costs for legal counsel regarding any such action or proceeding.

18. ATTORNEYS FEES AND COSTS:

18.1. If either party to this Agreement shall bring any action, claim, appeal, or alternative dispute resolution proceedings, for any relief against the other, declaratory or otherwise, to enforce the terms of or to declare rights under this Agreement (collectively, an Action), the losing party shall pay to the prevailing party a reasonable sum for attorneys' fees and costs incurred in bringing and prosecuting such Action and/or enforcing any judgment, order, ruling, or award (collectively, a Decision) granted therein. Any Decision entered in such Action shall provide for the recovery of attorneys' fees and costs incurred in enforcing such Decision. The court or arbitrator may fix the amount of reasonable attorneys' fees and costs on the request of either party. For the purposes of this paragraph, attorneys' fees shall include, without limitation, fees incurred in the following: (1) post-judgment motions and collection actions; (2) contempt proceedings; (3) garnishment, levy, and debtor and third party examinations; (4) discovery; and (5) bankruptcy litigation. "Prevailing party" within the meaning of this paragraph includes, without limitation, a party who agrees to dismiss an Action on the other party's payment of the sums allegedly due or performance of the covenants allegedly breached, or who obtains substantially the relief it seeks.

19. NOTICES:

19.1. All notices, requests, demands and other communications required or permitted under this Agreement shall be in writing and shall be deemed to have been received when delivered or faxed or on the fifth business day following the mailing, by registered or certified mail, postage prepaid, return receipt requested, thereof address as set forth below:

If to IID:

IMPERIAL IRRIGATION DISTRICT
Attention: General Manager
P.O. Box 937
333 E. Barioni Blvd.
Imperial, CA 92251

and

IMPERIAL IRRIGATION DISTRICT
Attention: Water Manager
P.O. Box 937
333 E. Barioni Blvd.
Imperial, CA 92251

If to ORMAT:

General Manager
ORMAT
947 Dogwood Road
Heber, CA 92249

With a copy to:

ORMAT NEVADA, Inc.
6225 Neil Road
Reno, NV 89511

Any party may change the addressee or address to which communications or copies are to be sent by giving notice of such change of addressee or address in conformity with the provisions of this paragraph for the giving notice.

20. AMENDMENT OR TERMINATION

20.1. This Agreement may be amended, in whole or in part, or terminated only by a written document executed by both parties.

21. ORMAT REPRESENTATIONS AND WARRANTIES.

- 21.1. ORMAT is a corporation duly organized and validly existing in good standing under the laws of the State of Delaware, and has all requisite power and authority to enter into and perform its obligations hereunder. The execution, delivery and performance by ORMAT of this Agreement has been duly authorized by all necessary action on the part of ORMAT and does not require any approval or consent of any holder (or any trustee for any holder) of any indebtedness or other obligation of ORMAT. This Agreement has been duly executed and delivered on behalf of ORMAT by the appropriate officers of ORMAT and constitutes the legal, valid and binding obligation of ORMAT, enforceable against ORMAT in accordance with its terms.
- 21.2. ORMAT holds a leasehold interest in the Project Site which allows ORMAT to occupy and use the Project Site for construction and operation of the Project, and ORMAT holds the rights to construct and operate the Project under the Conditional Use Permit.

22. INTEGRATION

- 22.1. This Agreement between ORMAT and IID and all attachments hereto, as well as any other documents referred to in this Agreement, constitute the entire Agreement between the parties with regard to the subject matter hereof and thereof. This Agreement supersedes all previous agreements between or among the parties. There are no other agreements, representations, or warranties between or among the parties other than those set forth in the documents identified above.

23. ENVIRONMENTAL COMPLIANCE AND MITIGATION.

- 23.1. ORMAT shall be responsible to ensure and fund all necessary efforts to comply with all environmental laws, including but not limited to CEQA, associated with the Project and the provision of water to the Project under this Agreement.
- 23.2. ORMAT shall be responsible to ensure and fund the implementation of necessary environmental mitigation required under all environmental laws, including but not limited to CEQA, associated with the Project and the provision of water under this Agreement.

24. Geothermal Mitigation.

- 24.1 ORMAT shall participate in the Imperial County Subsidence Detection Program and provide IID with all reports and findings. ORMAT shall provide IID with annual monitoring reports which shall be supplemented with defined benchmark/elevation locations to ascertain movement of IID's system. All costs will be funded by ORMAT.



24.2. In the event that geothermal induced ground movement from any and/or all ORMAT facility operations have impacted IID facilities, ORMAT shall be responsible for all costs involved in quantifying and mitigating said impacts to IID facilities such that a level of function at least equal to their function prior to operation of the various geothermal facilities is achieved.

IN WITNESS WHEREOF, ORMAT and IID have caused this Agreement to be executed and effective as of the Effective Date first above written.

IMPERIAL IRRIGATION DISTRICT

Date 10-7-08

By [Signature]
President

Date 10-7-08

ATTEST [Signature]
Secretary

^{President}
ORMAT, INC.

Date 10-23-08

By [Signature]

EXHIBIT A

WATER DELIVERY AND REPLACEMENT WATER SCHEDULE
(Acre-Foot/Year)

Contract Year	Calendar Year	Maximum Delivery Volume	Replacement Water Provided by Ormat	Maximum Use Amount
1	2009	6,800	0	6,800
2	2010	6,800	0	6,800
3	2011	6,800	0	6,800
4	2012	6,800	0	6,800
5	2013	6,800	0	6,800
6	2014	6,800	0	6,800
7	2015	6,800	0	6,800
8	2016	6,800	0	6,800
9	2017	6,800	0	6,800
10	2018	6,800	0	6,800
11	2019	6,800	1,360	5,440
12	2020	6,800	1,360	5,440
13	2021	6,800	1,360	5,440
14	2022	6,800	1,360	5,440
15	2023	6,800	2,720	4,080
16	2024	6,800	2,720	4,080
17	2025	6,800	2,720	4,080
18	2026	6,800	2,720	4,080
19	2027	6,800	2,720	4,080
20	2028	6,800	2,720	4,080

APPENDIX H
11-CAI-2

**DRAFT ENVIRONMENTAL IMPACT REPORT FOR ORMAT, EAST
BRAWLEY DEVELOPMENT PROJECT, ORNI. 19, LLC.**

**APPENDIX C-APPLICATION FOR TERTIARY TREATMENT SYSTEM
BRAWLEY WASTEWATER TREATMENT PLANT**

**APPENDIX C – APPLICATION
FOR TERTIARY TREATMENT SYSTEM,
BRAWLEY WASTE WATER TREATMENT PLANT**

ORMAT®



April 8, 2010

Gordon Gaste, AICP, Planning Director
City of Brawley
400 Main Street
Brawley, CA 92227

Application for Tertiary Treatment System, City of Brawley Wastewater Treatment Plant

Dear Mr. Gaste:

Attached is Ormat Nevada, Inc. (Ormat)'s application and Environmental Information Form for the tertiary treatment system project at the City's waste water treatment plant. Ormat would use the water from the outflow of the tertiary treatment plant as cooling make-up water for our proposed East Brawley geothermal power plant on the adjacent property to the east.

As we have discussed, there would be no significant environmental impacts of this project as it is all on disturbed, developed land at the existing wastewater treatment plant on City property with a simple pipeline going from the tertiary plant to our power plant on adjacent property. We already have documentation prepared with assistance from our consultants (Marie Barrett and Design Development Engineering/DDE) stating that the impacts from our East Brawley project to IID drains and Salton Sea ecosystem would not be significant; however, we have agreed to an EIR with the County to be focused on these issues. The documentation of potential impacts to drains and Salton Sea is attached to this application package.

The only potential impacts from the tertiary treatment system project would be similar, so it would make sense to combine the efforts of the County and the City for a single CEQA document/EIR to be prepared jointly by the County and the City, with the County continuing their lead on this under agreement with the City. I understand that the County has already initiated discussions with the City for this agreement.

Please contact me at 775-336-0173 or via e-mail (rleiken@ormat.com) and let me know if there is anything we can do to assist in moving the CEQA process expeditiously.

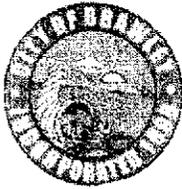
Sincerely,

Ron Leiken, QEP
Environmental/Regulatory Affairs Administrator

cc: Gary Burroughs, City of Brawley
Angelina Havens, County of Imperial
Jurg Heuberger, County of Imperial
Charlene Wardlow, Ormat
Bob Sullivan, Ormat
David Band, Ormat

ORMAT Nevada

6225 Neil Road, Reno, NV, 89511-1163 • Telephone (775) 356-9029 • Facsimile (775) 356-9039



CITY OF BRAWLEY
PLANNING DEPARTMENT
APPLICATION

Fee \$ _____
Planning Staff Initials _____
CITY STAMP
Amount Received \$ _____
Finance Initials _____

CHECK ALL THAT APPLY:

PROJECT

- Conditional Use Permit
 - New Extension/Renewal
- Adjustment Plat (Lot Line Adjustment/Lot Merger)
(no additional parcels to be created)
- Certificate of Compliance (required with Adj. Plat)
- Site Plan Review
- Variance
- Rezoning
- General Plan Amendment
- Right-of-Way / Alley Vacation
- Parcel Map Waiver
- Minor Subdivision *(4 or fewer parcels to be created)*
- Major Subdivision *(5 or more parcels to be created)*
- Final Map

CEQA STATUS

- Notice of Exemption
(ministerial and categorically exempt)
- Negative Declaration
(requires initial environmental study)
- Environmental Impact Report (EIR)

Other (Please Specify) _____

PROPERTY OWNER

Name: City of Brawley
 Mailing Address: 400 Main Street
Brawley, CA 92227
 Phone: (760) 344-8822
 Fax: (760) 344-0907
 E-mail: _____

ENGINEER / AGENT*

Ron Leiken
Omat Nevada, Inc.
Reno, NV 89511
(775) 336-0173
(775) 356-9039
rlleiken@omat.com

Assessor Parcel Number(s): 037-140-011

Describe project, purpose/reason for your application, proposed/existing uses on the subject property, and adjacent land uses. Attach separate sheet if necessary.

(attached)

REQUIRED SUPPORT DOCUMENTS

1. All applicable information requested on the Tentative Map Checklist (*Major Subdivisions*), Final Map Requirements (*Final Maps*), or Site Plan Checklist (*all projects*).
2. Environmental Assessment (*completed by applicant or legal representative*).
3. Preliminary Title Report/Deed (*for proof of ownership*)
4. Fee
5. Copy of current property tax statement.
6. Other items as determined by Staff.

SPECIAL NOTES

Applicant or authorized representative* must be present at Planning Commission meeting(s) and/or City Council meeting(s) for action to be taken on the application.

Submit twenty (20) copies of Parcel Maps for Adjustment Plats.

Twenty (20) copies of a site plan must submitted with the application. Projects in the Airport Land Use Commission sphere require thirty (30) copies.

Staff's acceptance of the application or deeming the application complete does not imply that Staff will recommend approval of the project.

City of Brawley owns property; Ormat is applying for project

I, _____,
(print name of property owner)

hereby apply to the City of Brawley for the actions indicated above for the above-specified property that I own or control, as per the attached information, and in accordance with all applicable local, state, and federal laws and regulations.

I, _____,
(print name of property owner)

give the following person/organization permission to act as my agent* and to make decisions in my name as he/she/they feel necessary for the project described on the previous pages.

Ron Leiken
(print name of agent)

Ormat Nevada, Inc.
(agent's company name, if applicable)

I certify that the above information, to the best of my knowledge, is true and correct.

Signature of Property Owner

Date

Ron Leiken
Signature of Agent

4/7/10
Date

*Property owner's signature must be notarized if an agent is being designated.

CITY OF BRAWLEY
ENVIRONMENTAL INFORMATION FORM

Date Filed: 04/06/2010

General Information

1. Developer or project sponsor

Name: Ormat Nevada, Inc.
Address: 6225 Neil Road Reno NV 89511
street city state zip

2. Person to contact concerning this project

Name: Ron Leiken - Environmental / Regulatory Affairs Administrator
Address: 6225 Neil Road Reno NV 89511
street city state zip
(775) 336-0173 (775) 356-9039 rleiken@ormat.com
phone fax e-mail

3. Address of project: 1550 Best Road, Brawley, CA

Assessor's Block and Lot Number (s): Parcel # 037-140-011

4. Existing zoning district:

5. Permit Application Number(s) for the project:

6. List and describe any other related permits and other public approvals required for this project, including those required by city, regional, state and federal agencies: _____

Imperial County - Conditional Use Permit for East Brawley pipeline and Power Plant

7. Proposed use of project site (attach separate sheets): (see attached)

Include In Project Description

8. Site size.
9. Square footage.
10. Number of floors of construction.
11. Amount of off-street parking provided.
12. Attach plans.
13. Proposed scheduling.
14. Associated projects.
15. Anticipated incremental development.
16. If residential, include the number of units, schedule of unit sizes, range of sale prices or rents and type of household size expected.
17. If commercial, indicate the type, whether neighborhood, city or regionally oriented, square footage of sales area, and loading facilities.
18. If industrial, indicate type, estimated employment per shift, and loading facilities.
19. If institutional, indicate the major function, estimated employment per shift, and loading facilities.
20. If the project involves a variance, conditional use or rezoning application, state clearly each is required.

Are the following items applicable to the project or its effects? Discuss below all items checked yes (attach additional sheets as necessary).

- | Yes | No | |
|-------------------------------------|-------------------------------------|--|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 21. Change in existing features of any bays, tidelands, beaches, lakes or hills, or substantial alteration of ground contours. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 22. Change in scenic views or vistas from existing residential areas or public lands or roads. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 23. Change in pattern, scale or character of general area project. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 24. Significant amounts of solid waste or litter. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 25. Change in dust, ash, smoke, fumes or odors in vicinity. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 26. Change in ocean, bay, lake, stream or ground water quality or quantity, or alteration of drainage patterns. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 27. Substantial change in existing noise or vibration levels in the vicinity |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 28. Site on filled land or on slope of 10 percent or more. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 29. Use of disposal of potentially hazardous materials, such as toxic substances, flammables or explosives. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 30. Substantial change in demand for municipal services (police, fire, water, sewage, etc.). |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | 31. Substantially increase fossil fuel consumption (electricity, oil, natural gas, etc.). |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 32. Relationship to a larger project or series of projects. (East Brawley Geothermal Power Plant) |

Environmental Setting

33. Describe the project site, as it exists before the project, including information on topography, soil stability, plants and animals, and any cultural, historical or scenic aspects. Describe any existing structures on the site, and the use of the structures. Attach photographs of the site. Snapshots or Polaroid photos will be accepted. (attached)
34. Describe the surrounding properties, including information on plants and animals and any cultural, historical or scenic aspects. Indicate the type of land use (residential, commercial, etc.), intensity of land use (one-family, apartment houses, shops, department stores, etc.), and scale of development (height, frontage, set-back, rear yard, etc.). Attach photographs of the vicinity. Snapshots or Polaroid photos will be accepted. (attached)

Certification: I, Ron Leiken,
print name

hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this initial evaluation to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.


signature

04/06/2010
date

Project Description – Brawley Tertiary System

Ormat is currently working with the City of Brawley to obtain treated, or recycled, water from their wastewater treatment plant located immediately west of the proposed East Brawley Power Plant site (Figure 2). Obtaining the reclaimed wastewater will require the construction of a tertiary system to the City's secondary system which is currently being upgraded by the City. The plan is to start construction in the 2nd quarter of 2010, and completion is expected in early 2013. The City of Brawley would ultimately own and operate the tertiary facility when it is completed.

The proposed tertiary treatment system will have a capacity of 5.9 mgd. As of 2008, existing Brawley WWTP average dry weather flows were 3.9 mgd. Therefore, the tertiary treatment system will operate at the initial available flow rate of 3.9 mgd but increase over time to 5.9 mgd as dry weather flow increases.

The new tertiary treatment system will receive water from a new Tertiary Treatment Diversion Structure which will be installed approximately 200 ft downstream of the existing Secondary Effluent Distribution Structure. Secondary effluent flow will be diverted from the existing 42-inch pipeline to the Tertiary Influent Pump Station wet well. From the wet well, water would be pumped into a flash mixing chamber for alum addition. Alum will be added using a high-energy direct-vacuum induction or pump diffusion system for near instantaneous and homogenous mixing.

Following flash mixing, the water will overflow into two (2) parallel flocculation and sedimentation trains. Flocculation will be based on a two-stage design. The first stage will provide greater mixing energy to begin particle agglomeration and floc formation. The second stage will impart less energy to avoid shearing and encourage continued growth of large settleable floc. After the flocculation chambers, water will flow into the rectangular sedimentation tanks. The majority of the suspended solids will be removed in the sedimentation basin and the supernatant will be collected via weirs from the top of the sedimentation basin. The supernatant would then flow into the multi-media filter by gravity. A polymer will be added to the water as needed to increase filter performance and minimize filtered effluent turbidity. The gravity multi-media filter would have four filtration cells operating in parallel with sand and anthracite media. The filtered water would be collected in the Filter Effluent Distribution Box.

The Filter Effluent Distribution Box will be designed with a three-way weir system that will allow the filtered water to flow into the Filter Backwash Supply Storage Sump, to the UV system by gravity, or to the Chlorine Contact Basin should the UV system become unavailable due to service interruption or maintenance. Once the water is disinfected by the existing UV system, the water would flow into the Effluent Pump Station Wet Well. Sodium hypochlorite will be injected at the dosage of 2 mg/L into the effluent pump station discharge pipe to maintain the residual disinfectant. The pump station would pump the disinfected tertiary water to the East Brawley Power Plant and/or to a storage equalization basin. The free chlorine residual will be monitored and analyzed downstream of the injection point. The equalization basin would hold approximately 5.0 MG to provide an operational buffer in case of WWTP or tertiary system interruptions, or Power Plant operational disruptions. A flow schematic for the normal operations in dry weather conditions is presented in Figure #2 – Process Flow Schematic.

If the UV system operations are disrupted for a brief amount of time, the secondary effluent would be diverted to the chlorine contact chamber instead of the tertiary treatment process. The secondary effluent would be chlorinated and discharged to the New River. In this short period the water demand at the East Brawley Plant would be met by utilizing the equalization storage.

The tertiary system would have infrastructure and control valves/gates in place to manually divert the tertiary effluent into the chlorine contact chamber (during dry weather periods only) for situations where the UV system would be unavailable for an extended period that would exhaust the equalization storage supply. To initiate this temporary tertiary disinfection mode, an operator would manually close the UV system inlet control gate which would cause water level in the filtered effluent distribution box to rise and overflow into the chlorine contact chamber. The chlorine contact chamber would be dosed with 5 mg/L of sodium hypochlorite to meet the Title 22 disinfected tertiary CT requirements. The chlorinated tertiary effluent would then flow to the Tertiary Effluent Pump Station via a dedicated pipeline and connect to the effluent pump station wet well bypassing the UV system. A flow schematic showing the described temporary dry weather operations with the UV system in service and out-of-service is presented in Figure #3 – Dry Weather Flow. A flow schematic showing the described temporary wet weather operations with the UV system in service and out-of-service is presented in Figure #4 – Wet Weather Flow.

As part of the normal dry weather tertiary operation, the Filter Effluent Distribution Box will allow the filtered effluent to flow into the Filter Backwash Supply Storage Sump. The weir height will be equivalent to the weir height that controls flow to the UV system. This would keep the Filter Backwash Supply Storage Sump full at all times. The sump would have the capacity to store water to satisfy two sequential filter backwash cycles without interrupting normal tertiary treatment system operation. The Filter Backwash Supply Pumps would convey the stored backwash supply water to the media filter at a higher rate to provide cleaning, fluidization and restratification of the media. The backwash wastewater would then be collected and conveyed back to the Influent Pump Station Wet Well.

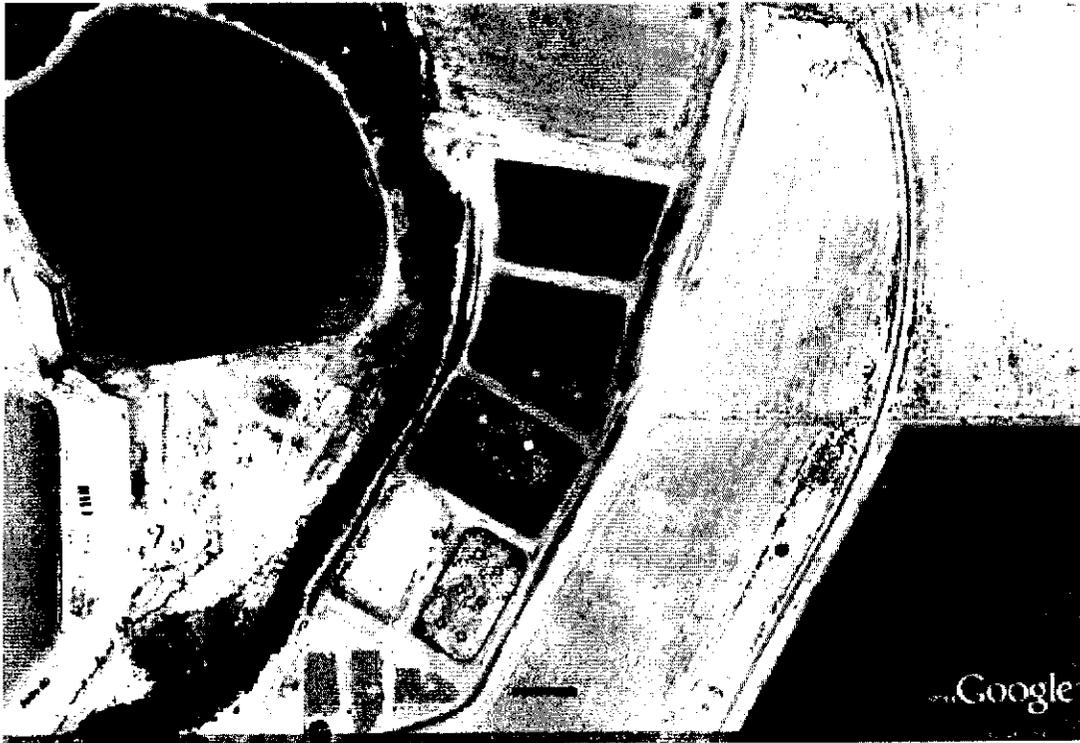
Alum sludge will be collected from the sedimentation basin using a chain and flight system and conveyed to a sludge holding tank. The sludge pumps will convey the collected sludge to a new centrifuge system. Two parallel centrifuges will be installed near the existing centrifuge. A new polymer system would be utilized at the new centrifuge system to increase the dewatering efficiency. The concentrate from the centrifuge would then be recirculated to the Tertiary Influent Pump Station wet well and the solids from the centrifuge would be collected and transferred to solids drying beds for further dewatering. Once the water content of the dried solids is reduced below 50%, the solids will be hauled off to a landfill for final disposal.

Chemical storage, feed systems, and electrical distribution and control system will occupy separate areas in a common building. The chemical area will house the following chemical feed and storage systems:

- Alum
- Caustic
- Sulfuric Acid
- Sodium Hypochlorite
- Polymer (Flocculation)
- Polymer (Dewatering)
- Sodium Bisulfite

Environmental Setting

33. As shown below, the project site is already a developed area, free of vegetation, plants, animals, and cultural and historical aspects. The project site is located at the City of Brawley's Wastewater Treatment Plant, and approximately 1/2 mile west of Ormat's proposed East Brawley Power Plant.



34. As shown below, the properties surrounding the site have been developed for agriculture. The Project site is bordered on the south by the City of Brawley Wastewater Treatment Facility and on the west by the New River.



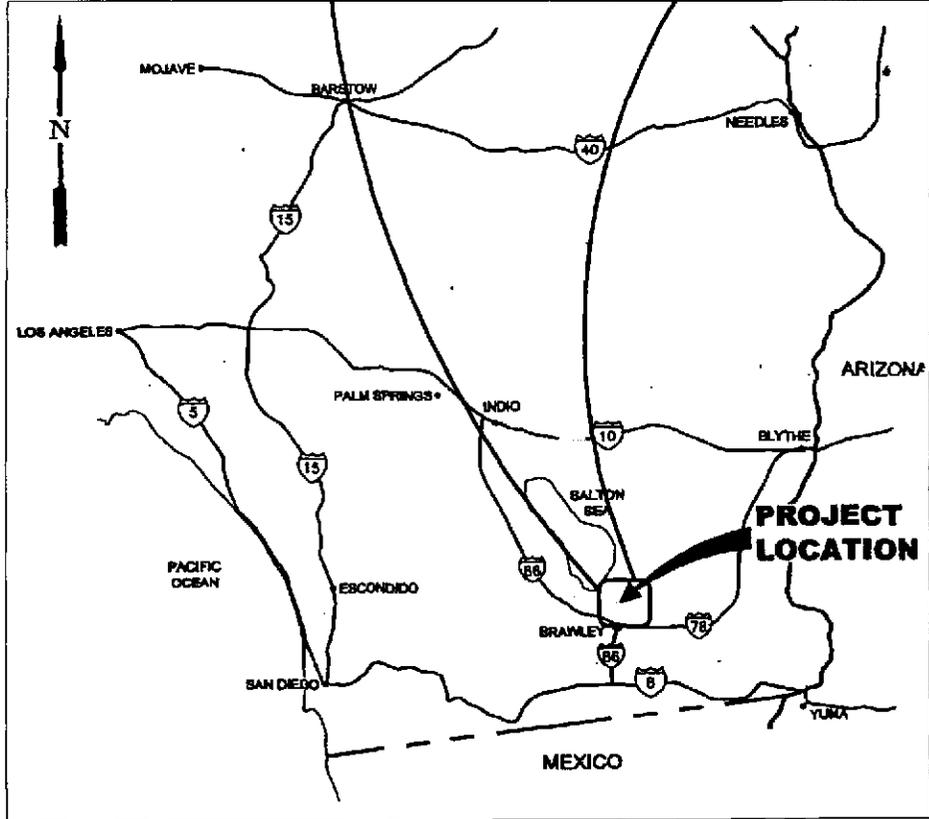
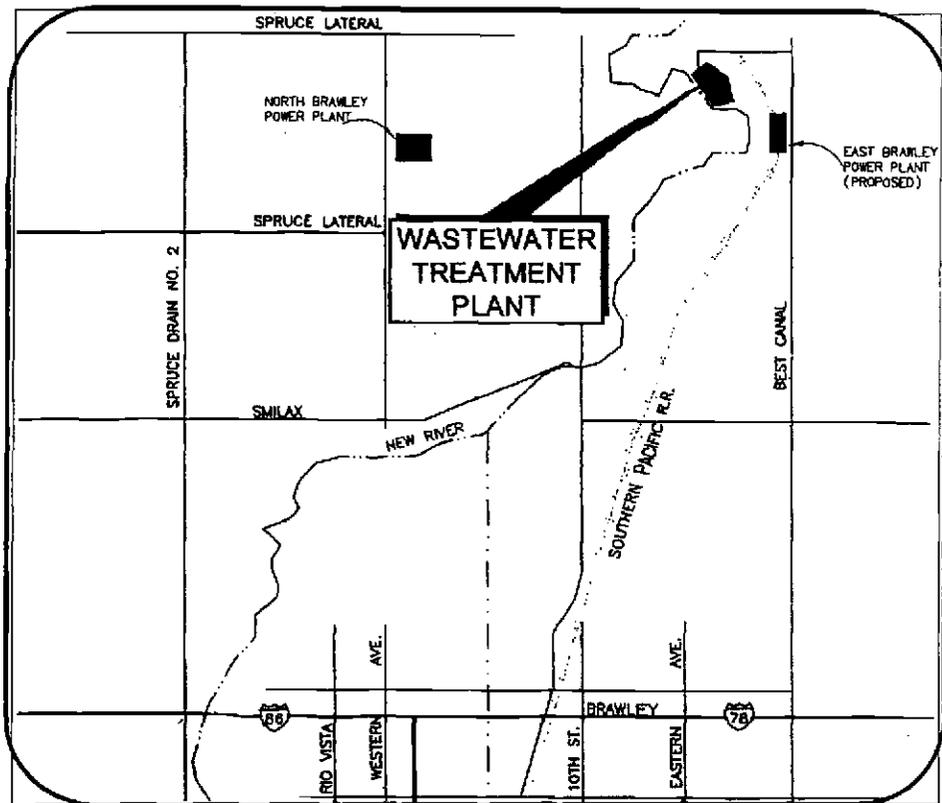
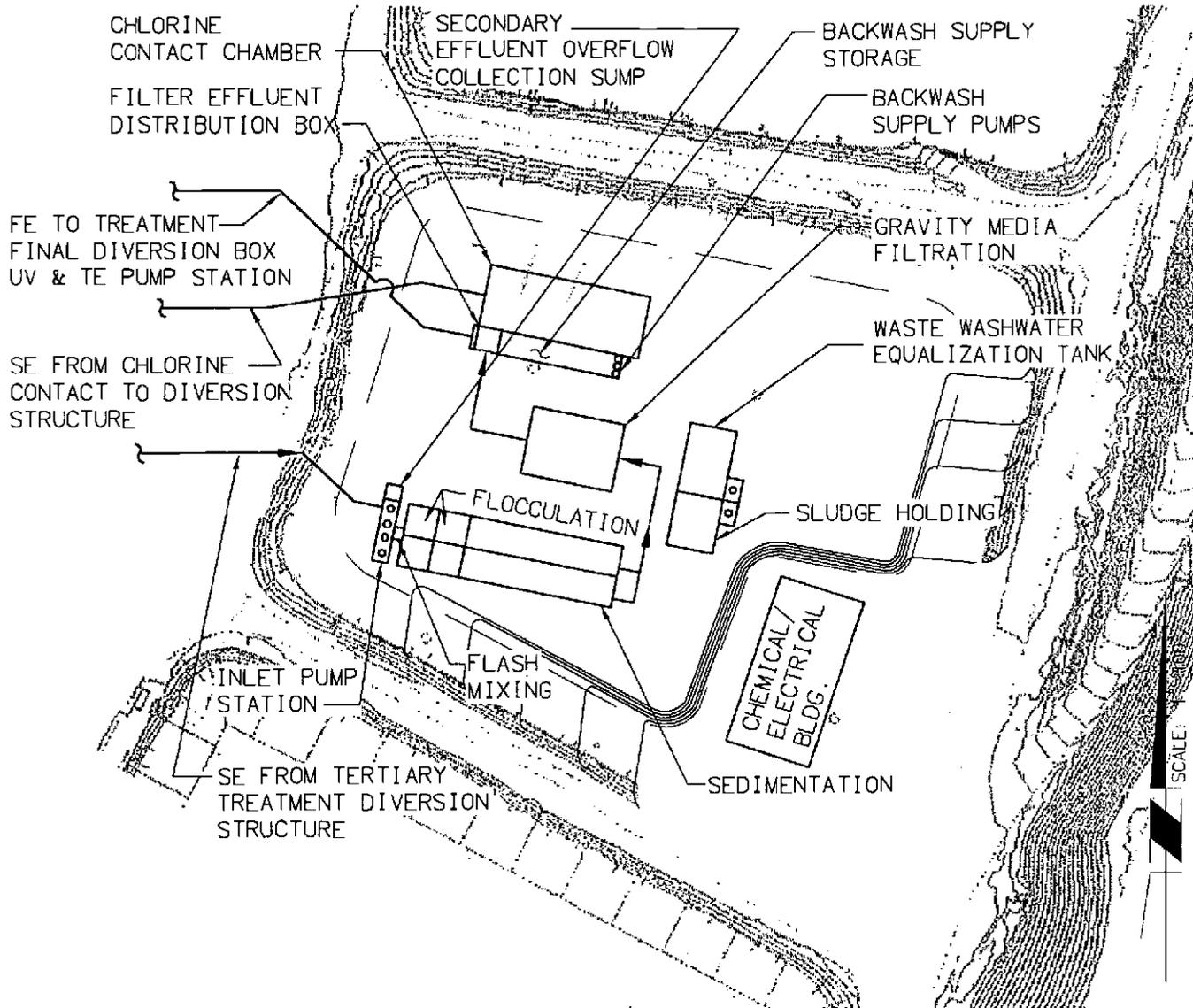
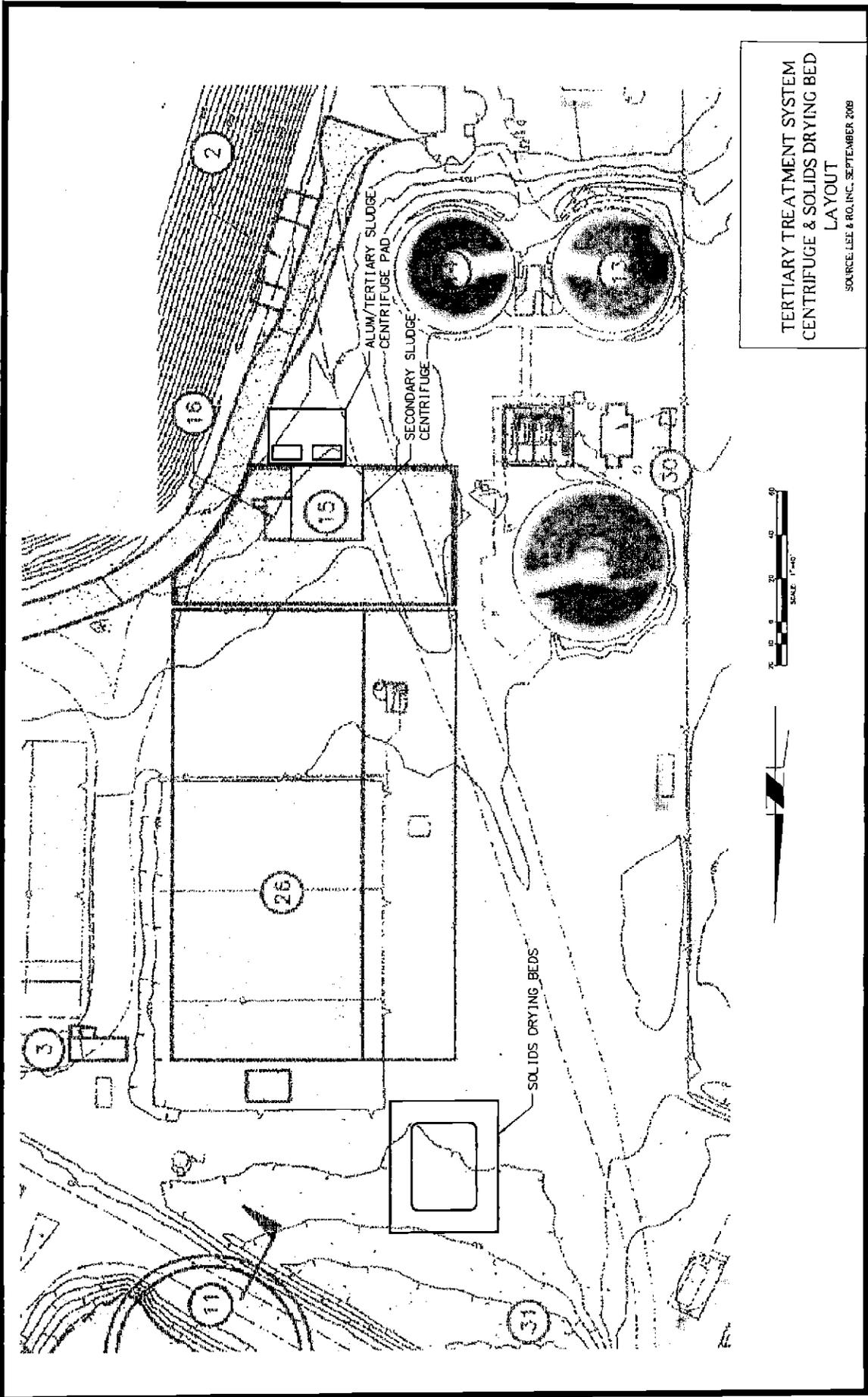


FIGURE 1-1
PROJECT LOCATION

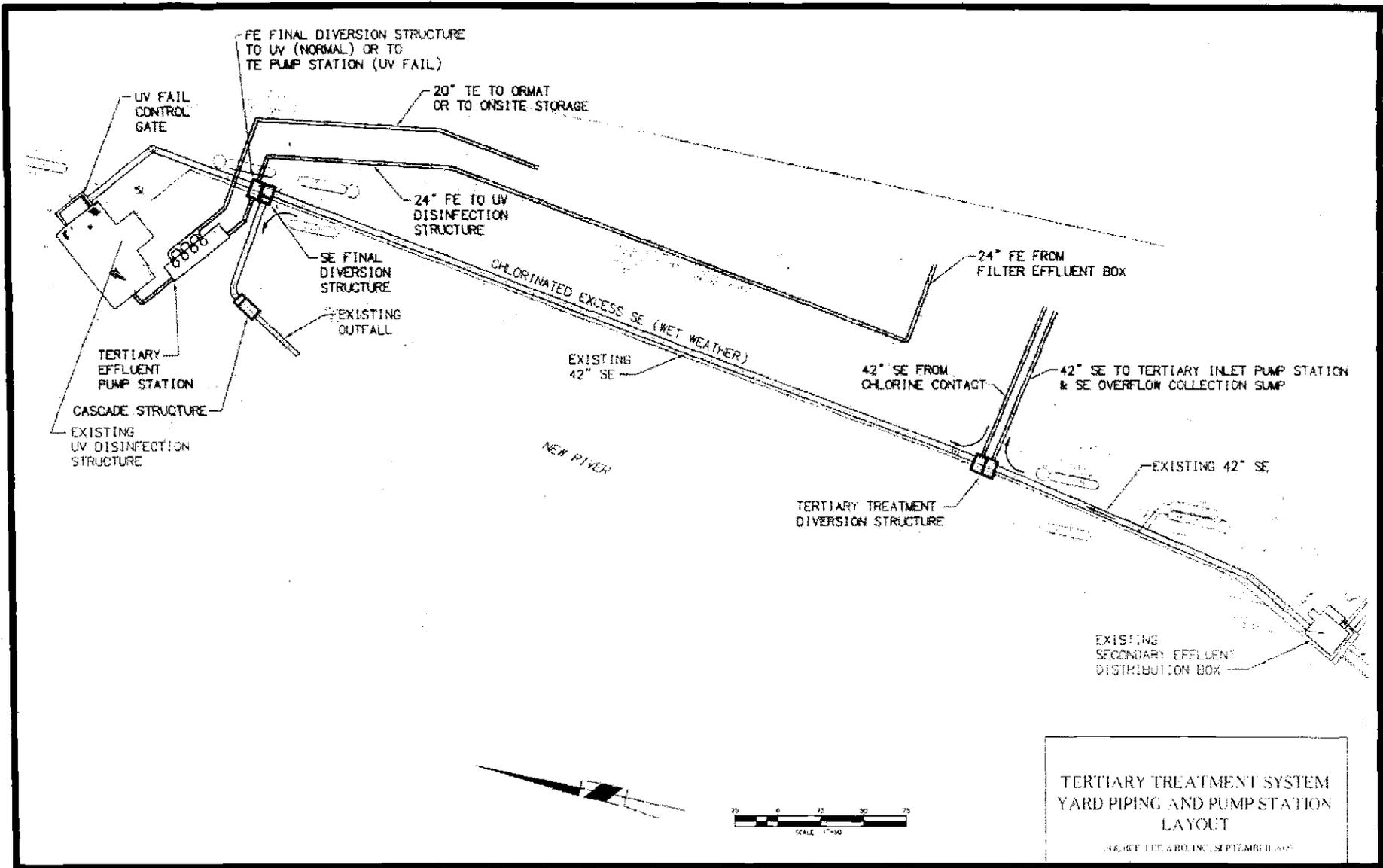


SITE PLAN FOR GRAVITY
MULTI-MEDIA FILTRATION
ALTERNATIVE



**TERTIARY TREATMENT SYSTEM
 CENTRIFUGE & SOLIDS DRYING BED
 LAYOUT**

SOURCE: LEE & RO, INC., SEPTEMBER 2008



TERTIARY TREATMENT SYSTEM
YARD PIPING AND PUMP STATION
LAYOUT
SCALE 1"=40'
REVISED 10/20/01

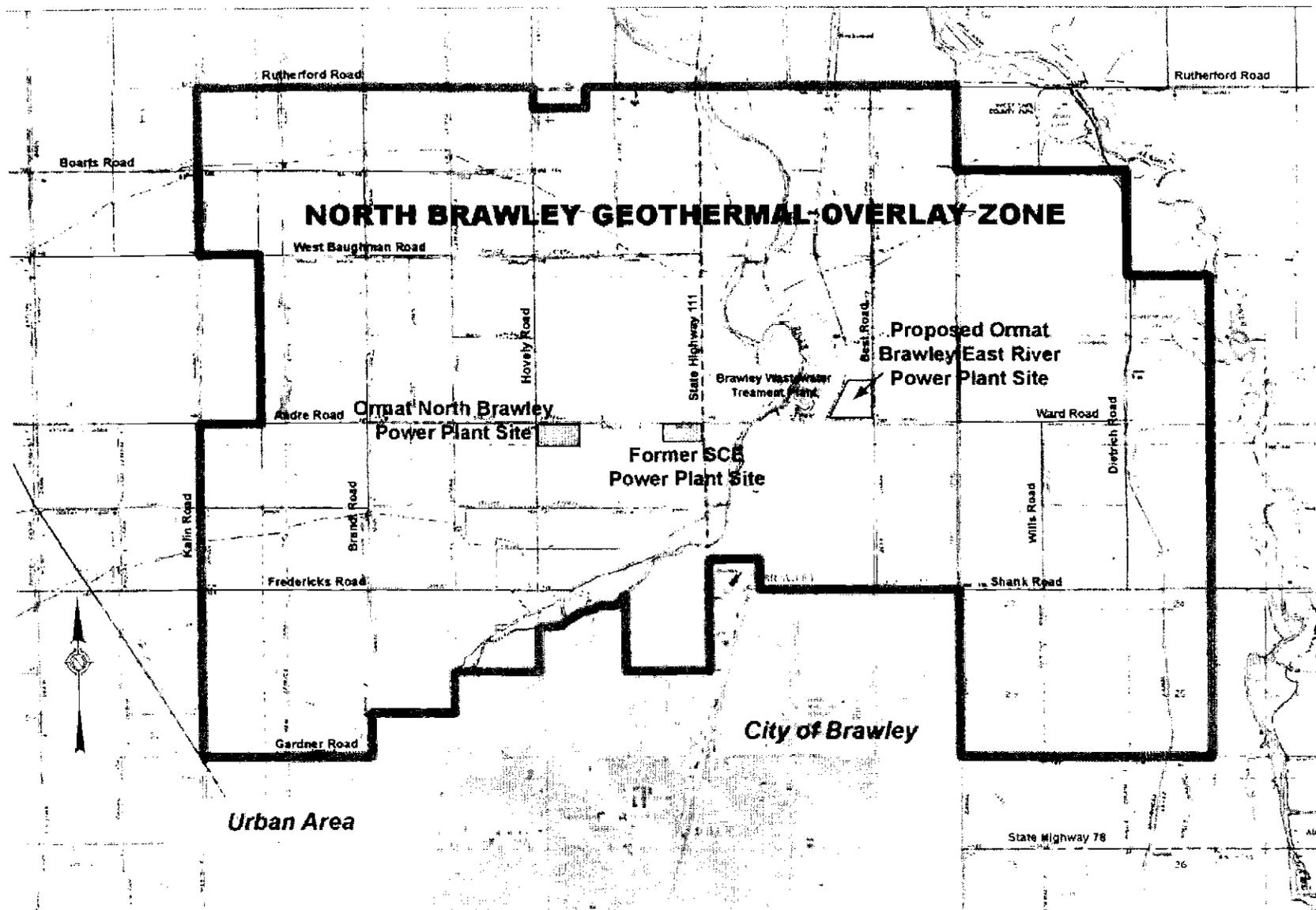


Figure 2: North Brawley Geothermal Overlay Zone Map Geothermal Wellfield – Brawley East River Development Project

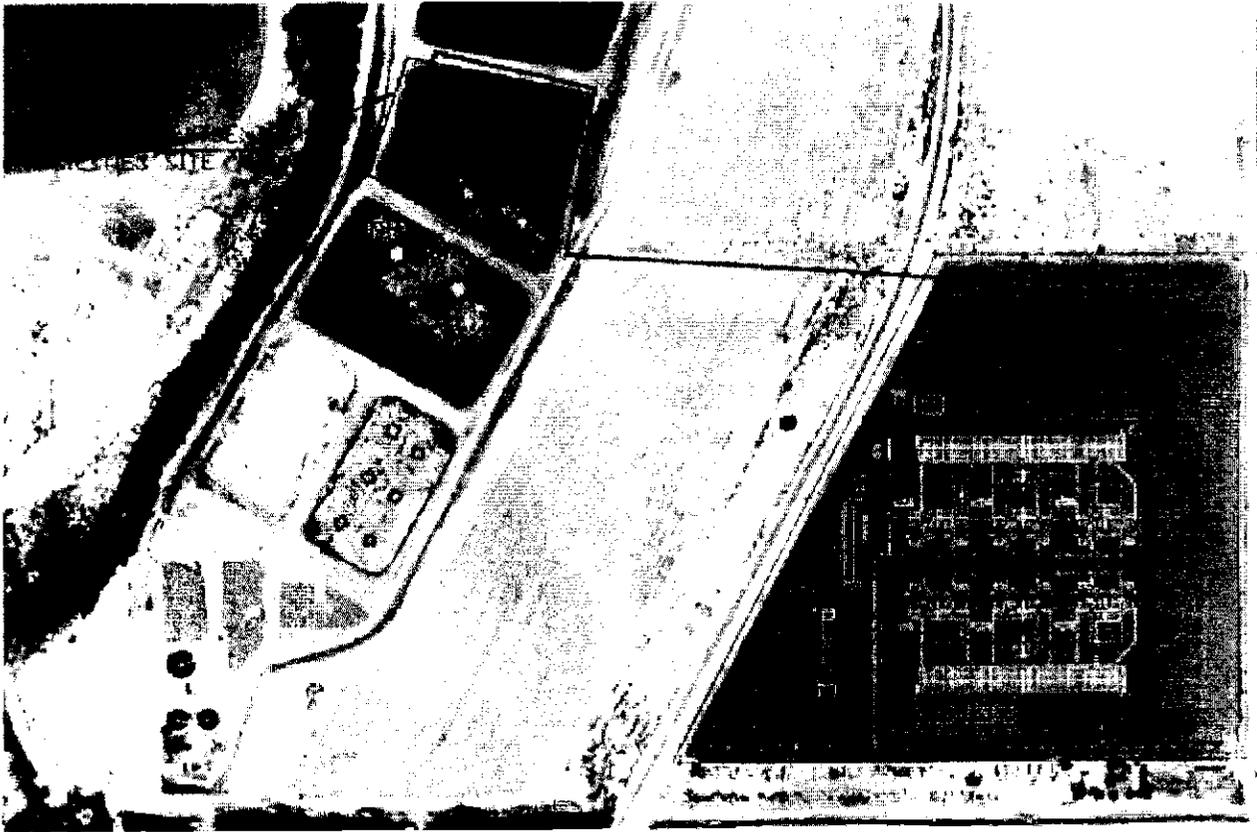


Figure 8: Proposed Tertiary Water Pipeline Route

Development
DESIGN &
ENGINEERING

Date: December 3, 2009

To: Whom it may concern

From: Development Design & Engineering, Inc.
(Contact: Derek Dessert)

Re: **ORMAT'S Environmental Assessment of East Brawley Geothermal Development Project's (EBGDP) Potential Impact to IID Drains & Salton Sea**

Executive Summary

The purpose of this evaluation is to analyze the potential environmental impacts of ORMAT'S EBGDP to IID drains and the Salton Sea. ORMAT is proposing to construct and operate the East Brawley Geothermal Development Project northeast of the City of Brawley in Imperial County, California. The proposed water use for the facility is 5,500 acre-feet / year. This is the approximate amount of water needed to irrigate 1,048 +/- acres of agricultural land in Imperial Valley based on the assumption that an average acre of agricultural land uses 5.25 acre-feet per year, which is the 2009 apportionment for water users that have eligible farmable cropland.¹ After analyzing the impacts of the EBGDP to IID drains and the Salton Sea, we determined that any potential impacts are negligible, or less than significant, for the following reasons:

- The agricultural equivalent of land that correlates with ORMAT'S proposed water use equates to approximately 0.23% of IID's irrigated acreage, an insignificant amount.
- Approximately 13% of the total irrigated acreage within the Imperial Unit is irrigated at least twice, which conveys additional water to IID drains and the Salton Sea. When compared to this additional drainage water, EBGDP's reduction to drainage water is insignificant.
- Assuming the total average irrigated acreage of the Imperial Unit uses 5.25 acre-feet per acre per year, ORMAT proposes to use approximately 0.2% of all water used for agriculture in the Imperial Unit, an insignificant amount.
- ORMAT's reduction in drainage water is approximately 0.12% of the total outflow of the Salton Sea through evaporation, an insignificant amount.
- EBGDP's loss of drainage water is approximately 0.2% of the amount of drainage water generated from Imperial Unit's total average irrigated area, an insignificant amount.

The data supporting the above statements is provided in the section below.

¹ 5.25 acre-feet / acre / year is the 2009 apportionment amount approved by the IID Board of Directors on November 18, 2008; therefore, this analysis assumes it to be the annual-per-acre-water-usage for irrigable land within the Imperial Unit.

1:760.353.8110
1:760.352.6408

1065 State Street
El Centro, CA 92243

info@dde-inc.net
www.dde-inc.net

Section A: Imperial Unit Irrigated Acreage

The following was taken from the Salton Sea Ecosystem Restoration Program Programmatic Environmental Impact Report (SSERPPEIR):

The IID water service area encompasses 1,061,637 acres (IID, 2005a) including 460,000 irrigated acres. Total average irrigated acres of crops are over 520,000 acres/year due to multiple cropping efforts on the same land.²

Based on the above-mentioned information, the agricultural equivalent of land that correlates with ORMAT's proposed water use (1,048 +/- acres) equates to approximately 0.23% of IID's irrigated area (approximately 460,000 acres). As IID's drainage conveyed to the Salton Sea is analyzed environmentally due to a reduction in the quantity of water used for agricultural purposes as development occurs, it is necessary to also consider increased drainage conveyed to the Salton Sea due to multiple cropping efforts per year on the same land. Based on the above-mentioned information from the SSERPPEIR, approximately 60,000 acres or 13% of the approximately 460,000 irrigated acres is being irrigated at least twice annually for agricultural purposes, thus conveying additional water to IID drains and the Salton Sea than compared to single irrigation efforts on such land. When the extra drainage water generated as a result of multiple cropping efforts per year on the same land is compared to the reduction in drainage water conveyed to District drains and the Salton Sea as an effect of the EBGDP, the result is clear that ORMAT's impact is insignificant. Under the assumption that the total average annual irrigated acreage (approximately 520,000 acres) of the Imperial Unit uses 5.25 acre-feet per acre per year, which equals 2,730,000 acre-feet per year, ORMAT is proposing to use 5,500 acre-feet per year or approximately 0.2% of the water used for agricultural production in the Imperial Unit.

Section B: Percentage of Conveyance to IID Drains and the Salton Sea / Evaporation

According to the SSERPPEIR the following is mentioned in regard to the quantity of drainage water conveyed to the Salton Sea:

Of the water delivered for on-farm use, 66 percent is used by crops, 3 percent is lost to evaporation from soil or water surfaces, 29 percent is captured in the drains as tailwater and tilewater that flows in the New and Alamo rivers or Salton Sea, and 2 percent seeps into the shallow groundwater and eventually flows into the Salton Sea.³

Under the above projection, 29% of approximately 5,500 acre-feet per year (approximately 1,595 acre-feet per year) would no longer be conveyed to IID drains and the Salton Sea based on ORMAT's proposed water use for the EBGDP.

² Salton Sea Ecosystem Restoration Program Draft Programmatic Environmental Impact Report, pg. 5-10.

³ Salton Sea Ecosystem Restoration Program Draft Programmatic Environmental Impact Report, pg. 5-10.

According to the SSERPPEIR, the following was stated regarding water inflow and outflow at the Salton Sea:

The estimated total average inflow to the Salton Sea, not including precipitation directly on the water surface, for the 1950 to 2002 period is estimated at 1,296,023 acre-feet/year with a minimum of 1,145,991 acre-feet/year in 1992 and a maximum of 1,464,736 in 1953. In recent years the total inflow has been about 1,300,000 acre-feet/year. The total outflow (through evaporation) for the historic period is estimated at 1,294,124 acre-feet/year⁴

Upon comparison of the 1,595 +/- acre-feet per year that would no longer be conveyed to the Salton Sea as a result of project development with 1,294,124 acre-feet per year as the above-mentioned Salton Sea outflow through evaporation, it is apparent that 1,595 +/- is insignificant. 1,595 +/- acre-feet is equivalent to approximately 0.12% of the annual water that evaporates at the Salton Sea. According to the SSERPPEIR, "Evaporation is the single largest hydrologic component in the Salton Sea water budget and the largest outflow factor."⁵ When 29% of the previously determined usage of 2,730,00 acre-feet per year for the Imperial Unit as well as ORMAT's projected use of 5,500 acre-feet per year are taken and compared, the result is EBGDP's loss of drainage water is 0.2 % of the amount of drainage water generated from Imperial Unit's total average irrigated area.

⁴ Salton Sea Ecosystem Restoration Program Draft Programmatic Environmental Impact Report, pg. 5-17, 18.

⁵ Salton Sea Ecosystem Restoration Program Draft Programmatic Environmental Impact Report, pg. 5-17.

t:760.353.8110
t:760.352.6408

1065 State Street
El Centro, CA 92243

info@dde-inc.net
www.dde-inc.net

From: Ron Leiken
Sent: Wednesday, December 09, 2009 9:33 PM
To: Vargas, Donald A
Cc: Angelina Havens; Remington, Michel D; VDBradshaw@IID.com; tshields@IID.com; Wilcox, Bruce; Marie Barrett; Derek Dessert; derek.dessert@gmail.com; Charlene Wardlow; Bob Sullivan; Randy Peterson; 'jurgheubergcr@co.imperial.ca.us'; 'jimminnick@co.imperial.ca.us'
Subject: Ormat's response to IID comments on the East Brawley Geothermal Project's Potential Impact to IID Drains & Salton Sea
 Dear Mr. Vargas,

This e-mail is in follow up to the one I sent this (Wednesday) morning. Because we were unable to meet in person today, I will provide our responses to your comments via this e-mail. I inserted our responses directly after your comments. Our responses are in blue font. If anybody is reading this from BlackBerry probably won't be able to see the font color and formatting. If anybody would like this in a Word document, please let me know.

Thank you again for your comments. Our responses below were prepared with assistance from our biological resources consultant, Marie Barrett, and Derek Dessert of DDE, the consultant who prepared the water supply assessment and the Salton Sea impact evaluation. In summary, as our responses below show, there are no significant impacts from the project. This is supported by the information we present below and by the simple inference that because DDE's evaluation clearly concluded that the proposed project would have a negligible or less-than-significant impact to the water supply to the Salton Sea, it can be inferred or implied that the impacts to biological resources as a result of this insignificant reduction in water would also be insignificant. We also show below that this project's contribution to cumulative impacts would also be less than significant.

Based on the previously completed studies and the information below, the recommendation for an Environmental Impact Report is unfounded and has no technical merit, as the numerous studies on the project over the last couple years clearly show that all potential impacts are less than significant. This includes professional studies of biological resources, cultural resources, traffic, air quality, noise, and water. All studies have shown that there are no potential significant impacts to any issue or topic area.

Ormat is a large private-sector employer in Imperial County, and adding this project to the several others we already have here would be of benefit to the County. As proven with other projects, Ormat is committed to implementing mitigation measures incorporated into the project and complying with our permit conditions. This project has already been stalled for a year, and we hope that we can get past these issues and move on and get this clean, renewable energy project started.

Regards,

Ron

<p>Ron Leiken Environmental/Regulatory Affairs Administrator Main: (775) 356-9029 Ext. 32273 Cell: (775) 771-8717 6225 Neil Road Reno, NV 89511 www.ormat.com r.leiken@ormat.com</p>	x
--	---

 Please consider the environment - do you really need to print this email?

From: Vargas, Donald A [mailto:DVargas@IID.com]
Sent: Tuesday, December 08, 2009 12:34 PM
To: Angelina Havens
Cc: Remington, Michel D; Bradshaw, Vikki Dee; Shields, Tina; Wilcox, Bruce
Subject: ORMAT'S Environmental Assessment of East Brawley Geothermal Development Project's Potential Impact to IID Drains & Salton Sea

Dear Ms. Havens

This is in response to Development, Design & Engineering's Environmental Assessment of ORMAT's East Brawley Geothermal Development Project's Potential Impact to IID Drains & Salton Sea dated December 3, 2009 and received today by e-mail.

The Imperial Irrigation District (IID) has reviewed the assessment and submits the following comments:

1. Since the attached document lacks any assessment of cumulative impacts considering other industrial facilities whose water use (or potential water use) would reduce the inflow conveyed to IID drains and subsequently, the Salton Sea, it's difficult to evaluate Ormat's findings. It is advisable that project proponent present a cumulative impact analysis on inflow to IID Drains and the Salton Sea.

A brief cumulative impact analysis is as follows. The geothermal projects for which water applications have been submitted to IID and/or where CUP applications have been submitted to Imperial County for new industrial projects total approximately 8700 ac-ft. These include:

- a. East Brawley at 5500 ac-ft.
- b. Approximately 800 ac-ft for CHAR's Hudson Ranch 1 project, and
- c. Approximately 2400 ac-ft for CalEnergy's Black Rock projects at 800 ac-ft each.

This total combined amount of water from these projects is approximately 1.5% of the 25,000 ac-ft allocated by IID for industrial use under the IWSP for non-agriculture projects. Using the same calculations as those previously done for East Brawley, 8700 ac-ft calculates to 2523 ac-ft less to the drains ($8700 \times 29\%$ (% of water to file/drains) which is less than 0.2% of the water evaporated from the Salton Sea. Thus, this cumulative loss of water to the drains and ultimately from proposed projects is also insignificant. Additionally, no one drain will be impacted more than another. As a side note, rather than an adverse cumulative impact, there is actually a positive cumulative impact from these projects, in that this water reduces the amount of salt going to the sea by 8,700 tons!

2. Project proponent did not address which drains will be impacted by the facility (there may be direct impacts to the drains discharging to the Salton Sea and that may have pupfish present). Also the assessment lacked proper location of facility, making it difficult to evaluate any other wildlife species issues, such as Yuma Clapper Rail.

There are no drains near the proposed East Brawley power plant site that drain directly to the Salton Sea. Biological surveys completed in the area for the East Brawley project found no pupfish or Yuma Clapper Rail habitat. The project site is only 32.75 acres which will equal $32.75 \times 5.25 = 172$ ac-ft $\times 29\%$ = 50 ac-ft of water less to the Livesley Drain which is adjacent to the property. The 5500 ac-ft needed for this project and the loss of 1595 ac-ft to the drains that results would not come from that specific area but generically from the entire IID system. Taking "away" 5500 acre-feet of water from agriculture, which is what is implied, would be spread across the IID's district, not in the project area. Thus, 5500 ac-ft $\times 29\%$ = 1595 ac-ft less to drains across the county. If the same assumption is used for 8700 ac-ft, $(8700$ ac-ft $\div 2.770,000)$ = 0.32% less water goes to the drains from these proposed industrial projects. This is an insignificant cumulative loss which also would not affect vegetation and/or wildlife found on the drains and/or the Salton Sea.

3. We recommend that the project proponent review the IID's draft Integrated Water Resources Management Plan (IWRMP aka IRP) on the IID website (water page). Although the IRP will not have any significant impact until such time that our Board of Directors approves the plan, it provides a valuable source of information on water supply issues. However, pending approval of the IRP, the Interim Water Supply Policy (IWSP), will impact the project. The IID has adopted this Interim Water Supply Policy (IWSP) for Non-Agricultural Projects in order to address proposed projects that will rely upon a water supply from the IID.

during the time that the IRP is still under development. The Interim Water Supply Policy is referenced in the IRP but can also be accessed at <http://www.iid.com/Media/Interim-Water-Supply-Policy-6-16-09-final-draft.pdf>

Ormat has reviewed the IWRMP, participated in IID meetings and submitted extensive comments. The document contains much incorrect data about existing geothermal projects in the valley in addition to cooling technologies that are not viable in this meteorological environmental. We have submitted similar comments to the California Energy Commission. The use of geothermal steam condensate for cooling water, which is source of water for flash plants, causes depletion of the geothermal resource, subsidence, and release of the noncondensable gases from the geothermal fluid and produces geothermal scales that may be hazardous. Whereas, the Ormat binary process which requires "raw" water eliminates these negative environmental impacts. This is viewed as that the Ormat binary process is a much cleaner and environmentally sound method over steam and flash type plants, and certainly an environmental improvement over coal and gas power plants.

4. Project proponent should comply with the various applicable requirements of the IID Water Conservation and Transfer Project draft Habitat Conservation Plan (HCP) and provide the analysis of compliance with the HCP (or at least the existing Section 7 Biological Opinion) and CESA 2081. The project's analysis and CEQA document should demonstrate that they have reviewed the requirements and provide some level of detail as to whether the project is in compliance or recommend mitigation consistent with the HCP and/or existing permit requirements. This should include some level of cumulative analysis and some recognition of the seasonal importance of the loss of drain water. The following are the access links to the documents mentioned:

- The **HCP** is part of the IID Water Conservation and Transfer Project, Final EIR/EIS and can be found at <http://www.iid.com/Water/FinalEIR/EIS>; Volume II, Appendix A, Habitat Conservation Plan. The HCP in Draft EIR/EIS (there may be small changes in draft HCP from draft and final version of the EIR/EIS. It is in a different appendix in the draft than the final EIR/EIS. We use the draft HCP at his point; the final HCP will be approved with the NCCP can be accessed at <http://www.iid.com/Water/DraftEIR/EIS>
- The **Biological Opinion (federal ESA permit)** is at <http://www.iid.com/Media/In-Valley-BO.pdf>
- The **CESA 2081** (the water transfer operates under this state ESA permit until NCCP is approved) can be found at <http://www.iid.com/Media/California-Endangered-Species-Act.pdf> and at <http://www.iid.com/Media/LCR-MSCP-CESA-2081-Permit-Final.pdf>
- The **MMRP (Mitigation Monitoring and Report Program)** Various permits reference the EIR/EIS so the MMRP is used in our current implementation) http://www.iid.com/Media/Exhibit-B---MMC_MMRP_Complete_6-12-08.pdf

We have reviewed the mentioned documents. As shown in the calculations above, the proposed amount of water is insignificant to biological resources and, thus, will not impact either individually or cumulatively the requirements of the IID Water Conservation and Transfer Project draft HCP.

In addition, pending the City of Brawley's completion of upgrades to the treatment plant currently scheduled for 2012, tertiary treated water is planned to replace IID's pending water contract. Therefore, this is a temporary use of "raw" water from IID, about 2-5 years.

5. Due to the size of the project we feel it is appropriate to recommend that the project proponent develop an Environmental Impact Report (EIR).

For the reasons stated at the top of this e-mail and in our direct responses above, the use of IID's temporary water commitment to the East Brawley project is insignificant. We feel it would be

completely inappropriate to recommend an EIR, as the many technical studies already performed for the project concluded there would be no significant impact. There is no technical merit to recommending or requiring an EIR.

Should you have any questions, please do not hesitate to contact me by phone at 760-482-3609 or by e-mail. Thank you for the opportunity to comment on this matter.

Donald Vargas
Environmental Specialist I
Environmental Compliance Unit
Environmental, Regulatory & Emergency Planning Section
Imperial Irrigation District
321 S. Waterman Ave., Suite 100
El Centro, CA 92243
Tel: (760) 482-3609
Cel: (760) 427-8099
Fax: (760) 482-3603
E-mail: dvargas@iid.com

"If you don't know where you're going any road will take you there" -George Harrison

STATE OF CALIFORNIA

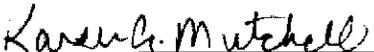
Energy Resources Conservation
and Development Commission

In the Matter of Complaint Against)
ORMAT NEVADA, INC. Brought By) Docket No. 11-CAI-02
CALIFORNIA UNIONS FOR RELIABLE)
ENERGY)

PROOF OF SERVICE

I, Karen A. Mitchell, declare that on August 29, 2011, I served the attached **VERIFIED ANSWER OF RESPONDENT ORMAT NEVADA, INC. TO VERIFIED COMPLAINT AND REQUEST FOR INVESTIGATION BY CALIFORNIA UNIONS FOR RELIABLE ENERGY** via electronic and U.S. mail to all parties on the attached service list.

I declare under the penalty of perjury that the foregoing is true and correct.



Karen A. Mitchell

SERVICE LIST
11-CAI-02

RESPONDENT

Ormat Nevada, Inc.
6225 Neil Road
Reno, NV 89511

COUNSEL FOR RESPONDENT

Christopher T. Ellison
Samantha Pottenger
Ellison, Schneider and Harris, LLP
2600 Capitol Avenue, Suite 400
Sacramento, CA 95816
cte@eslawfirm.com
sgp@eslawfirm.com

COMPLAINANT

California Unions for Reliable Energy
c/o Adams Broadwell Joseph & Cardozo
Marc D. Joseph
Tanya A. Gulesserian
Elizabeth Klebaner
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080
mdjoseph@adamsbroadwell.com
tgulesserian@adamsbroadwell.com
eklebaner@adamsbroadwell.com

INTERESTED
AGENCIES/ENTITIES/PERSONS

Imperial County Planning and Development
Services
801 Main Street
EI Centro, CA 92243

Imperial County Air Pollution
Control District
150 South 9th Street
EI Centro, CA 92243-2801

Imperial Irrigation District
333 E. Barioni Boulevard
Imperial, CA 92251

ENERGY COMMISSION
DECISIONMAKERS

Robert B. Weisenmiller
Chair and Associate Member
rweisenm@energy.state.ca.us

Karen Douglas
Commissioner and Presiding Member
kldougla@energy.state.ca.us

Kenneth Celli
Hearing Officer
kcelli@energy.state.ca.us

ENERGY COMMISSION
CHIEF COUNSEL

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Chief Counsel
e-mail service preferred
mlevy@energy.state.ca.us

ENERGY COMMISSION STAFF

Bob Worl
Project Manager
rworl@energy.state.ca.us

Jeff Ogata
Assistant Chief Counsel
jogata@energy.state.ca.us

ENERGY COMMISSION
PUBLIC ADVISER

Jennifer Jennings
Public Adviser
e-mail service preferred
publicadviser@energy.state.ca.us

EXHIBIT 3



ADAMS BROADWELL JOSEPH & CARDOZO

A PROFESSIONAL CORPORATION

ATTORNEYS AT LAW

601 GATEWAY BOULEVARD, SUITE 1000
SOUTH SAN FRANCISCO, CA 94080-7037

TEL: (650) 589-1660
FAX: (650) 589-5062

eklebaner@adamsbroadwell.com

SACRAMENTO OFFICE

520 CAPITOL MALL, SUITE 350
SACRAMENTO, CA 95814-4721

TEL: (916) 444-6201
FAX: (916) 444-6209

DANIEL L. CARDOZO
THOMAS A. ENSLOW
TANYA A. GULESSERIAN
JASON W. HOLDER
MARC D. JOSEPH
ELIZABETH KLEBANER
RACHAEL E. KOSS
ROBYN C. PURCHIA

OF COUNSEL
THOMAS R. ADAMS
ANN BROADWELL

March 25, 2011

VIA FACSIMILE AND U.S. MAIL

Mr. Armando G. Villa
Planning & Development Services Director
Imperial County Planning & Development Services Department
801 Main Street
El Centro, CA 92243-2811
Fax: (760) 353-8338

Ms. Sylvia Bermudez
Clerk of the Board of Supervisors
Imperial County
940 West Main Street, Suite 209
El Centro, CA 92243
Fax: (760) 482-4215

**Re: Public Records Act Request – East Brawley Geothermal
Development Project (Conditional Use Permit No. 08-0023)**

Dear Mr. Villa and Ms. Bermudez:

We are writing on behalf of California Unions for Reliable Energy ("CURE") to request a copy of all documents in the possession of Imperial County regarding the ORMAT, East Brawley Geothermal Development Project.

This request is made pursuant to the California Public Records Act. (Government Code §§ 6250, et seq.) Pursuant to Government Code section 6253.1, the County is required to assist us in identifying records that are responsive to this request. The Public Records Act imposes affirmative duties on the responding agency to assist the requester in at least three ways: identifying records responsive to the request or its purpose; describing the information technology and the physical location in which the records exist; and providing suggestions for overcoming any practical basis for denial of records access. (Gov. Code, § 6253.1, sub (b)(1)) If you

2328-003v

Mr. Armando G. Villa
Ms. Sylvia Bermudez
March 25, 2011
Page 2

believe our request is too broad, ambiguous, or otherwise inadequate, please assist us in revising the language of our request.

This request is also made pursuant to Article I, section 3(b) of the California Constitution, which provides a Constitutional right of access to information concerning the conduct of government. Article I, section 3(b) provides that any statutory right to information shall be broadly construed to provide the greatest access to government information and further requires that any statute that limits the right of access to information shall be narrowly construed.

Pursuant to the Public Records Act (Gov. Code, § 6253.9), if the requested documents are in electronic format and are 10 MB or less (or can be easily broken into sections of 10 MB or less), please email them to me as attachments. However, if necessary, we will pay for any duplication costs associated with fulfilling this request up to \$200.

Please contact Ms. Janet Laurain with a cost estimate before copying the requested materials, regardless of whether or not the cost estimate exceeds the \$200 threshold. Ms. Laurain's contact information is as follows:

Janet Laurain
Environmental Specialist
(650) 589-1660
jlaurain@adamsbroadwell.com

Thank you for your attention to this matter.

Sincerely,

Elizabeth Klebaner

EK:vs
cc: Janet M. Laurain (email only)

maria scoville

From: maria scoville
Sent: Monday, April 11, 2011 3:36 PM
To: Angelina Havens
Cc: Adriana Anguis; Carina Alcantar; Correnne D; Iris Davis; Jade P; maria scoville; Rosa Soto
Subject: Orni 19, LLC CUP08-0023 Copy request from Adam Broadwell

Angie the Adams Broadwell request for copies to CUP08-0023 have been mailed FED with their account, the total of pages was 1,151 with a total of \$115.00.

Maria Scoville
Office Assistant III
Imperial County Planning &
Development Services Dept.
760-482-4675/760-353-8338 Fax

Good afternoon Ms Lauren
total of copies is \$115.00
Please submit check to
801 Main St, El Centro CA 92243
ICPDS.
Thank you!
maria S..

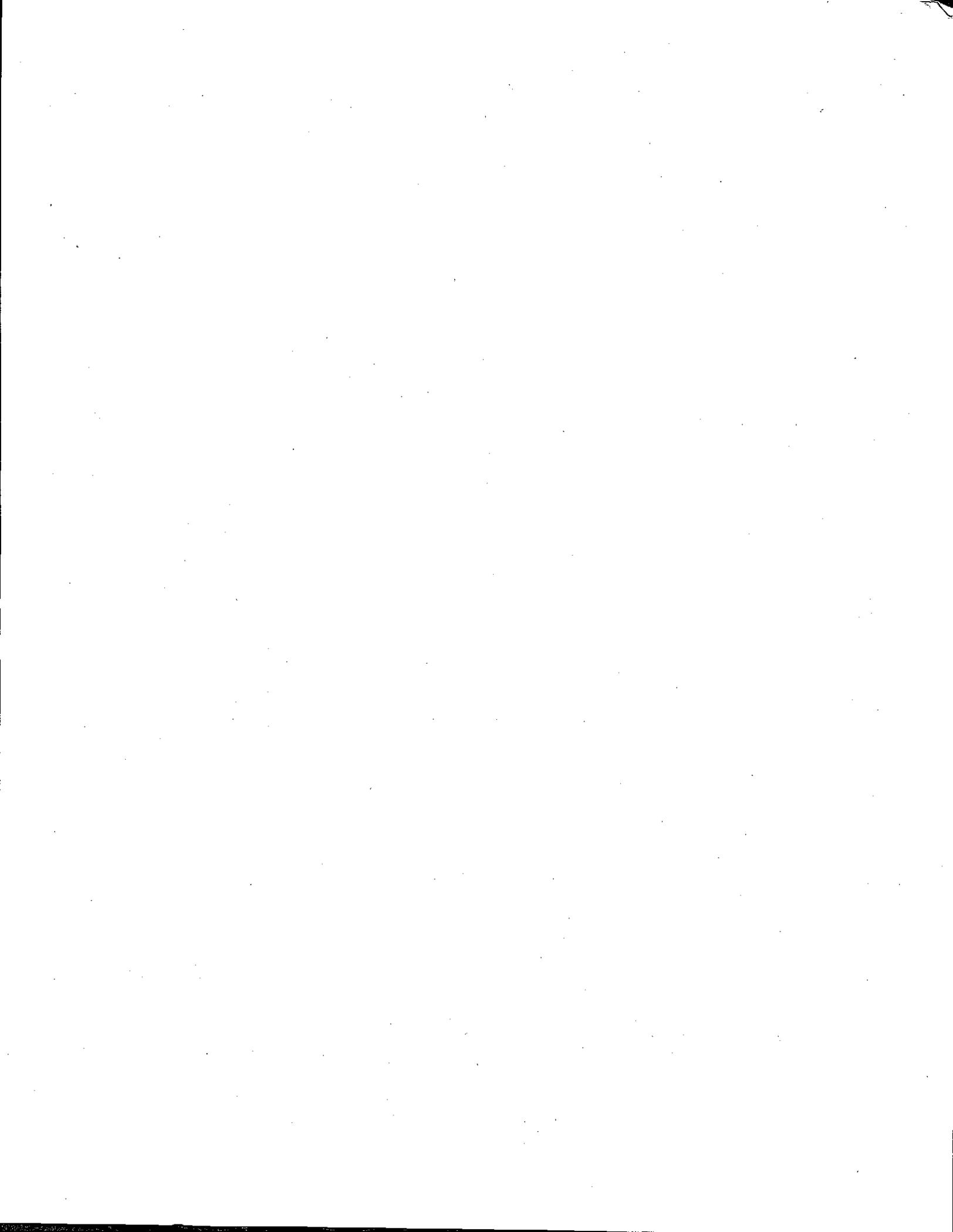


EXHIBIT 4



RECORDING REQUESTED BY
SAFECO TITLE INSURANCE COMPANY
PINNEY & CALDWELL, A P.C.

BOOK 1525 PAGE 429

48

SOLORES PROVENCIO
COUNTY OF IMPERIAL

JUL 6 11 37 AM '84

OFFICE 1408
IMPERIAL CLON Y. CALIF.

BOOK 1525 PAGE 429

AND WHEN RECORDED MAIL THIS DEED AND UNLESS OTHERWISE SHOWN BELOW, MAIL TAX STATEMENTS TO

NAME PINNEY & CALDWELL, A P.C.
ADDRESS P O Box 710
CITY & STATE E. Centro CA 92244

FEE \$5.00

Title Order No. _____ Parcel No. _____

SPACE ABOVE THIS LINE FOR RECORDER'S USE

3760-16
37102-06

GRANT DEED

The undersigned declares that the documentary transfer tax is \$ _____ **No Tax Due** and is
 computed on the full value of the interest or property conveyed, or is
 computed on the full value less the value of liens or encumbrances remaining thereon at the time of sale. The land, tenements or realty is located in:
 unincorporated area city of _____ and

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,

JOHN A. FLAMMANG and LOIS E. FLAMMANG, husband and wife as community property,

hereby GRANT(S) to **LOMA FARMS, INC.,** a California corporation,

the following described real property in the county of **Imperial**, state of California:

See Legal Description Attached

The Grantors and grantees are the same parties, and their proportionate interests in the real property have not changed and is exempt pursuant to Ordinance 25312, and expressly qualifies as no change in ownership under Revenue and Taxation Code §62(a)(2).

NOTE: This deed is an EXCHANGE of real property between grantors and grantee. (Qualified like kind exchange under I.R.C. §1031)

Dated July 3, 1984

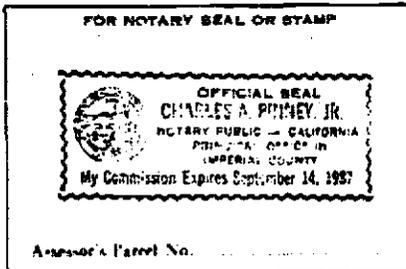
John A. Flammang
JOHN A. FLAMMANG

Lois E. Flammang
LOIS E. FLAMMANG

STATE OF CALIFORNIA }
COUNTY OF IMPERIAL } ss.
On July 3, 1984 before me, the undersigned Notary Public in and for said County and State, personally appeared **JOHN A. FLAMMANG and LOIS E. FLAMMANG**

_____ personally known to me in the persons _____ who claim to be the within signatories, and acknowledged to me that they executed the same.

Charles A. Pinney, Jr.
Notary Public



MAIL TAX STATEMENTS IF PARTY SHOWN ON FOLLOWING LINE IF NO PARTY SO SHOWN, MAIL AS DIRECTED ABOVE
Loma Farms, Inc. P O Box 134 Brawley, Ca 92227
Name Street Address City & State

- PARCEL 1: The East 990 feet of the South half of the West half of Tract 91.
- PARCEL 2: That part of the West 1650 feet of the South half of the West half of Tract 91, LYING East of the center line of Imperial Irrigation District drain ditch as located August 8, 1936, across said South half of West half of said Tract 91.
- PARCEL 3: That part of the Southeast Quarter of the West half of Tract 120, lying East of the East line of the Right of way of the Southern Pacific Railroad Company

The above parcels are located in Township 13 South, Range 14 East, S.B.M., in the County of Imperial, State of California, according to the Official Plat of United States Government Re-Survey approved and on file in the United States Land Office.

ACTIVITY AND USE LIMITATIONS (AULS) EXHIBITS

Recording Requested By:
IMPERIAL IRRIGATION DISTRICT

88-07818

BOOK 1603 PAGE 587

DOLORES PROVENCIO
COUNTY RECORDER

And When Recorded Mail To

MA-12 11 02 PM '88

IMPERIAL IRRIGATION DISTRICT
P. O. BOX 1806
EL CENTRO, CALIFORNIA 92244

IMPERIAL COUNTY, CALIF.

BOOK 1603 PAGE 587

NO FILE

Space Above This Line For Recorder's Use

IID-909 (R4 5-87)

RIGHT-OF-WAY EASEMENT

For good and valuable consideration, receipt of which is hereby acknowledged, the undersigned herewith convey _____ to IMPERIAL IRRIGATION DISTRICT, its successors or assigns, a right-of-way easement for the purpose of constructing, operating and maintaining a power line or lines, underground and/or overhead and necessary appurtenances attached thereto or as from time to time may be reconstructed, enlarged or otherwise changed, over and across

The NE 1/4, Section 11, T. 10 S., R. 13 E., S.B.B.&M.

COUNTY OF Imperial, STATE OF CALIFORNIA

Said right of way being described as:

The west 30 feet of said NE 1/4 of Section 11, T. 10 S., R. 13 E., S.B.B.&M.

The grantee shall have the right of ingress and egress over and along said right of way for its representative and equipment. Also the right to keep the right of way free from brush, wood growth or any obstructions which might be deemed a hazard. Any use of said right-of-way easement shall not determine or limit the extent of the easement granted herein.

The grantor shall also have the right to remove or destroy any obstruction or structure which might now exist or exist in the future on said right of way.

IN WITNESS WHEREOF said grantor S on 14 heretofore affixed Handwritten Signature 1988 LHR

5th day of April

LOMA FARMS, INC.

By John G. Flemons Jr. Pres.
By Handwritten Signature
Grantor

NOTARIES - USE PROPER FORM ON BACK
#17346

STATE OF CALIFORNIA

CORPORATION FORM

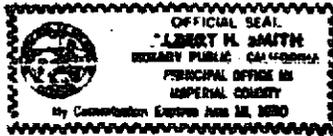
County of Imperial

On April 5, 1988 before me, Albert H. Smith the undersigned
Notary Public, personally appeared John A. Flammberg President, and
Leis E. Flammberg Secretary,

Personally known to me
 Proved to me on the basis of satisfactory evidence
to be the persons who executed the within instrument on behalf of LOMA FARMS, INC.
the corporation therein named and acknowledged to me that said corporation
executed the same.

WITNESS my hand and official seal

Albert H. Smith
Notary Signature



STATE OF CALIFORNIA

WITNESS FORM

County of _____

On _____ before me, _____ the undersigned
Notary Public, personally appeared _____

Personally known to me
 Proved to me on the basis of satisfactory evidence
to be the person whose name is subscribed to the within instrument, who being by me
duly sworn deposes and says: that _____ he resides in _____ County and that _____ he
was present and saw _____
personally known to him to be the same person, whose name _____ subscribed to the within and
annexed instrument, execute and deliver the same, and _____ he acknowledged to said affiant that _____ he
executed the same; and the said affiant subscribed his name thereto as a witness.

WITNESS my hand and official seal.

Notary Signature

STATE OF CALIFORNIA

GENERAL FORM

County of _____

On _____ before me, _____ the undersigned
Notary Public, personally appeared _____

Personally known to me
 Proved to me on the basis of satisfactory evidence
to be the person who executed the within instrument and acknowledged to me that _____ he executed the
same.

WITNESS my hand and official seal.

Notary Signature

STATE OF CALIFORNIA

GENERAL FORM

County of _____

On _____ before me, _____ the undersigned
Notary Public, personally appeared _____

Personally known to me
 Proved to me on the basis of satisfactory evidence
to be the person who executed the within instrument and acknowledged to me that _____ he executed the
same.

WITNESS my hand and official seal.

Notary Signature

140-640

CERTIFICATE OF ACCEPTANCE
GOV. CODE SEC. 27261

This is to certify the interest in real property conveyed by RIGHT OF WAY AGREEMENT

dated MAY 5, 1988 from LOMA FARMS, INC.

to Imperial Irrigation District, an irrigation district, is hereby accepted by order of the board of directors of said district as per Resolution No. 238-87, dated November 3, 1987, and the grantee consents to recordation thereof.

Dated MAY 12, 1988

By Larry E. Beck
Secretary

Acceptance No. 17346

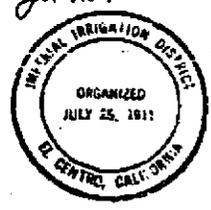
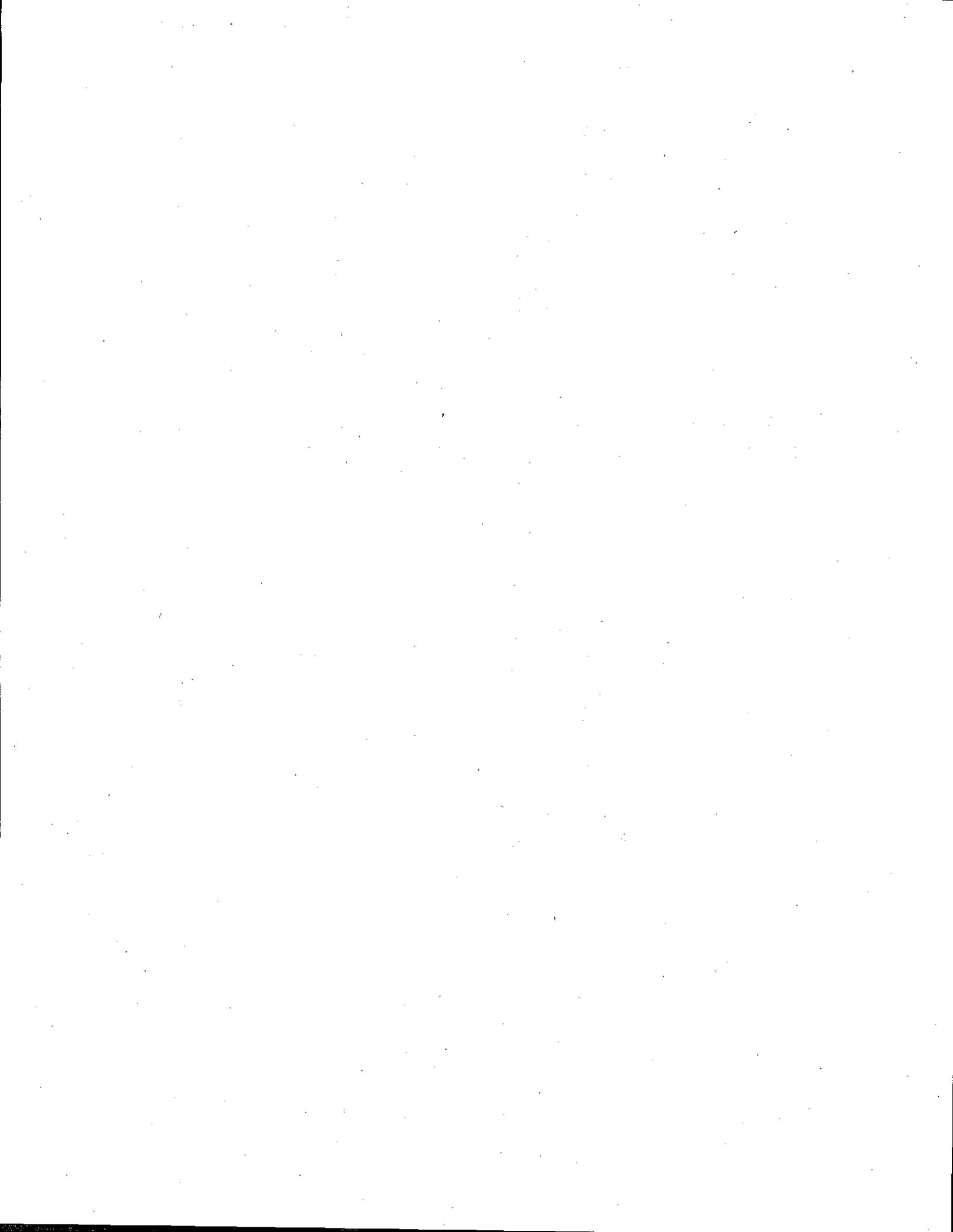


EXHIBIT 5



APPLICATION **CONDITIONAL USE PERMIT**

- APPLICANT MUST COMPLETE ALL NUMBERED (black) SPACES - please type or print -

1.	PROPERTY OWNERS NAME Victor V. & Janet D. Veysey Trust	PHONE (760) 344-9800
4.	MAILING ADDRESS 3651 Austin Road	CITY Brawley STATE CA ZIP CODE 92227
3.	PROPERTY APPLICANT'S NAME Ormat Nevada, Inc.	PHONE (562) 544-5141
4.	MAILING ADDRESS (street / p.o.) P.O. Box 177	CITY Brawley STATE CA ZIP CODE 92227
5.	ENGINEERS NAME NA	CAL. LICENSE NO. NA PHONE NA
6.	MAILING ADDRESS (street / p.o.) NA	CITY NA STATE NA ZIP CODE NA
7.	PROPERTY (site) ADDRESS NA	
8.	ASSESSORS PARCEL NO. 037-140-01, 037-140-02, and 037-160-47	SIZE OF PROPERTY (in acres or sq. feet) 325 acres, 325.47 acres, and 36.27 acres, respectively
9.	LEGAL DESCRIPTION (attach separate sheet if necessary) See Attached Site Plans (1 of 3) and (3 of 3).	

PLEASE PROVIDE CLEAR & CONCISE INFORMATION

10.	DESCRIBE PROPOSED PROJECT (specific use of property) North Brawley Geothermal Exploration Project (see attached project description).
11.	DESCRIBE CURRENT USE OF PROPERTY General Agriculture - Zoned A2G (Geothermal Overlay Zone)
12.	DESCRIBE PROPOSED SEWER SYSTEM NA
13.	DESCRIBE PROPOSED WATER SYSTEM NA
14.	DESCRIBE PROPOSED FIRE PROTECTION SYSTEM NA
15.	IS THE PROPOSED USE A BUSINESS? If yes, how many employees will be at this site? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no

REQUIRED SUPPORT DOCUMENTS

A. DETAILED SITE PLAN (see back side)

B. FEE _____

C. OTHER _____

I / WE CERTIFY THAT I AM / WE ARE THE OWNER(S) OF RECORD AND THE INFORMATION SUPPLIED INFORMATION TO THE BEST OF MY KNOWLEDGE, IS TRUE AND CORRECT.

John C. Veysey
 Print Name _____ DATE 6-14-06

SIGNATURE OF PROPERTY OWNER
 Joseph S. Matlick / Project Manager
 Print Name _____ DATE May 5, 2006

SIGNATURE OF APPLICANT _____

APPLICATION RECEIVED BY	DATE	REVIEW / APPROVAL BY OTHER DEPTS. REQUIRED.
APPLICATION DEEMED COMPLETE BY	DATE	<input type="checkbox"/>
APPLICATION REJECTED BY	DATE	<input type="checkbox"/> APCD
TENTATIVE HEARING BY	DATE	<input type="checkbox"/> DES
FINAL ACTION	DATE	
<input type="checkbox"/> APPROVED	<input type="checkbox"/> DENIED	

FEE

\$ _____

CUP- _____

PLANNING DEPARTMENT - Imperial County

C.U.P.

East Brawley Geothermal Development Project
Amendment to Conditional Use Permit Application
Submitted August 2009
New River Pipeline Crossing and Revised Well Field
August 6, 2009

New River Pipeline Crossing

Project Description

This project involves the installation of piping over the New River north of the City of Brawley, east of Highway 111 and Andre Road and just south of the City of Brawley's Wastewater Treatment Plant (See attached figure). It will be located on private land (APN 037-140-02-01) owned by Veysey, Victor V. & Janet D and under lease to ORNI 17, LLC in the southeast corner of Tract 118 (see map). Several pipes from geothermal pads on the east side of New River will be extended across the New River (WGS 84 33°1'01.4"/115°31'12.1"). The pipes will allow connection of geothermal wells located on both sides of the river. The river at the crossing will be approximately 12 feet wide and begins at the end of a private road on each side of the river. The crossing will support the following equipment as shown in the attached drawings by Tobey Wade Structural Engineers:

- 2 x 24 inch geothermal brine lines
- 2 x 12 inch Noncondensable gas lines (mostly carbon dioxide)
- A 36 inch cable tray for power and control cables
- A man walkway for maintenance and inspection

The footings to support the pipes will be approximately 15-20 foot square on each side of New River. A total of two footings will be placed approximately 10 feet east and west of the bank of New River. The footings are located in an area of sparse vegetation (photographs attached) consisting of salt cedar (*Tamarix sp.*). The area necessary for construction activities will be approximately 100 feet and will be located east and west of the bank of New River.

The pipes will be constructed of industrial standard designation of "extra heavy" wall thickness. An automatic injection pump shut-off and check-valve

system will immediately stop fluid flow should a leak or break occur in any of the pipes. A system of pressure and flow sensing devices, capable of detecting any leak or spill, would be installed and maintained. Additionally, the pipelines would be inspected on a regular basis. The crossing and pipelines will be designed, engineered, manufactured and assembled to perform and comply with all the relevant county, state and federal regulations such as California Building Code, ASME and OSHA.

The pipe will be positioned through the use of cranes located east and west of the bank of New River. Other construction equipment will include a forklift, water truck, backhoe and loader. The area on each side of the river where the crossing will be anchored is flat and will require minimal grading. No grading permit is anticipated to be required based on the amount of dirt to be moved. The anchors will be away from the river bed. Erosion control measures will be implemented if the final design indicates that protection of the river is needed from potential erosion or run-off during construction. Construction time will be brief; approximately five to six weeks.

Locked gates will be located over the pipelines on each end of the crossing to prevent public access. There will be a walk way area to allow workers to inspect the pipelines, there is no vehicle access. The gates will signed "private property" and "no trespassing" in both English and Spanish.

Biological Impacts

The area was surveyed by Marie Barrett, biologist, on February 10 and 25, 2009. No burrowing owls or burrows were found within the two proposed crossing areas. Two crossing areas had been proposed:

Crossing site	(WGS 84) Latitude/longitude	Comments
North crossing	33°1' 01.4"/115°31'12.1"	Less vegetation
South crossing	33°0' 55.6"/115°31'19.7"	More vegetation; further distance for construction

The north crossing was selected on the basis that it was not disruptive to vegetation found near the bank and was closer to geothermal pads.

No cattails (*Typha sp.*) or Phragmites (*Phragmites sp.*) are found in or near the crossing so there will be no disturbance to Yuma clapper rail (*Rallus longirostris yumanensis*).

The salt cedar (*Tamarix sp.*) is not a dense thicket in the area of the crossing. The crossing construction will be offset from the bank and minimal disruption to vegetation will occur. The duration of construction will be brief (about one week per side) and no permanent damage will occur. Therefore, no disruption would be expected to the southwestern willow flycatcher (*Empidonax traillii extimus*).

No wheat, alfalfa or Bermuda grass crops are grown within 200 feet of the crossing, therefore, no mountain plover (*Charadrium mongolus*) disturbance would be expected.

If construction is not started within 30 days, a new burrowing owl survey will be required.

There will be no alteration of a stream bed or disruption of waters of the United States. Construction activities will be concentrated to the west and east of the bank of New River with no discharge into the New River. All construction will be above the ordinary high water mark and, therefore, will not be considered to be within a jurisdictional "Water of the United States" (photographs attached).

Cultural Resources

The area was surveyed by Tierra Environmental Services in March 2009. No previously recorded cultural resources were located within the exact project area according to the records search nor were any unrecorded sites found during the site survey. Their report dated March 17, 2009 is attached.

Air Emissions

The pipelines will be closed with no air emission points on this section.

Other Environmental Impacts

There will be no other environmental issues associated with this pipeline crossing

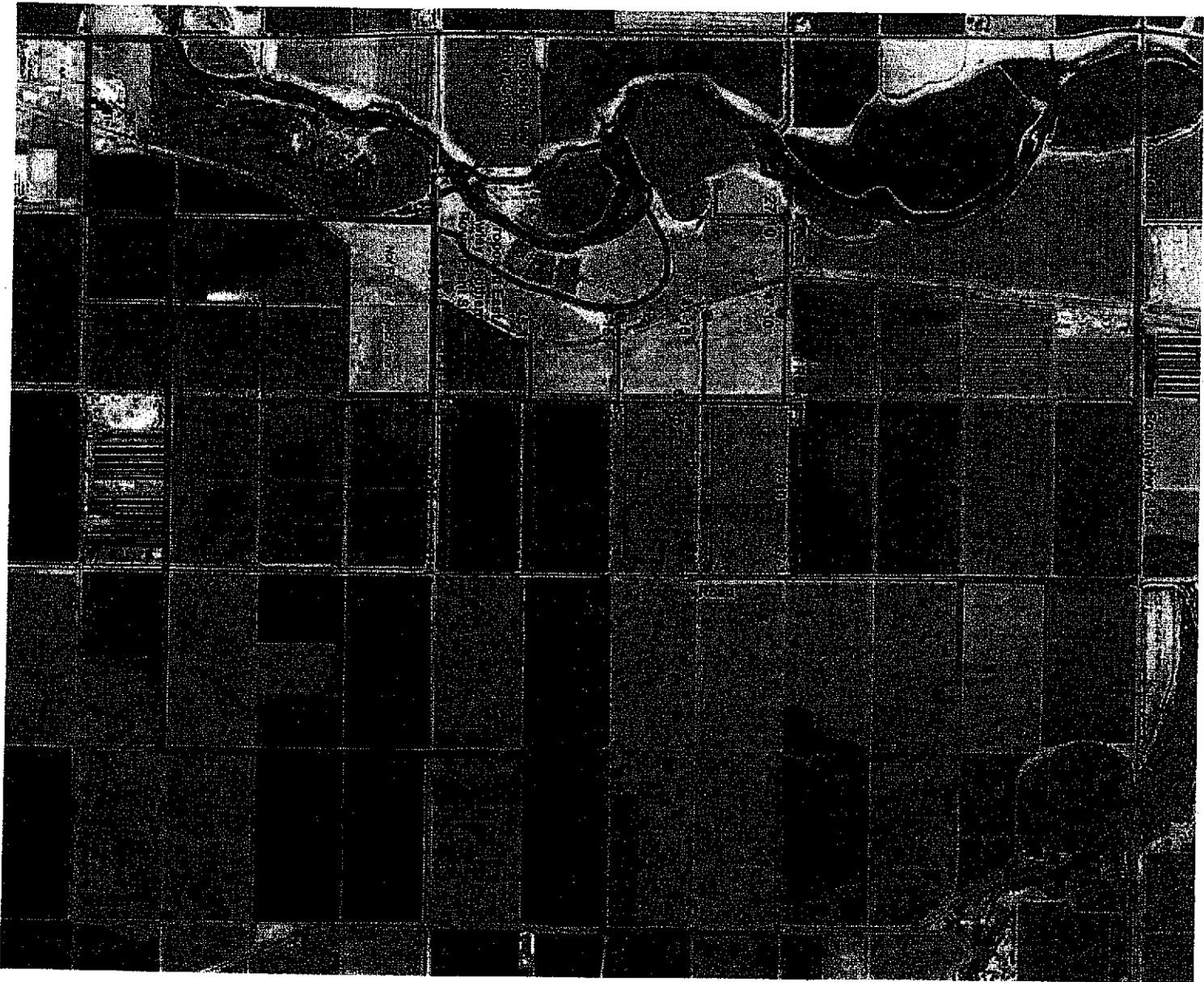
Revised Well Field

The well field is being amended to reflect addition land that has been leased and purchased and the results of the exploration well drilling to date. The total well count has also dropped from 60 to 34 excluding the cooling tower blow down wells. It will still be split about equal between production and injection wells. The New River pipeline crossing is also reflected on the revised map. The amount of pipeline in the well field will be reduced as a result of less wells and a consolidated well field. Several of the well pads on the south end of the field will be best accessed from Shank Road.

Ormat has obtained an easement from the Imperial Irrigation District (IID) for the transmission line routing along Ward Road to the west of the proposed plant location. They own parcel number 037-160-51-01, a 5.78 acre parcel between the railroad and the Veysey parcel.

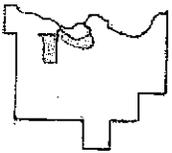
Ormat was selected by the City of Brawley to negotiate exclusively for the water from their Waste Water Treatment Plant. Ormat proposes to build the upgrades needed to bring the facility to tertiary treatment and then give the facility to the City and pay for the water via an operations and maintenance agreement. The City will be the CEQA lead agency for this project. The treatment plant will generate enough water for the East Brawley power plant such that canal water from the IID will only need to be a backup once the facility is built.

This realignment of the well field will have less impact than the project as originally proposed as it is smaller. Biological and cultural resource surveys will be performed to duplicate those already completed on the other areas of the project.



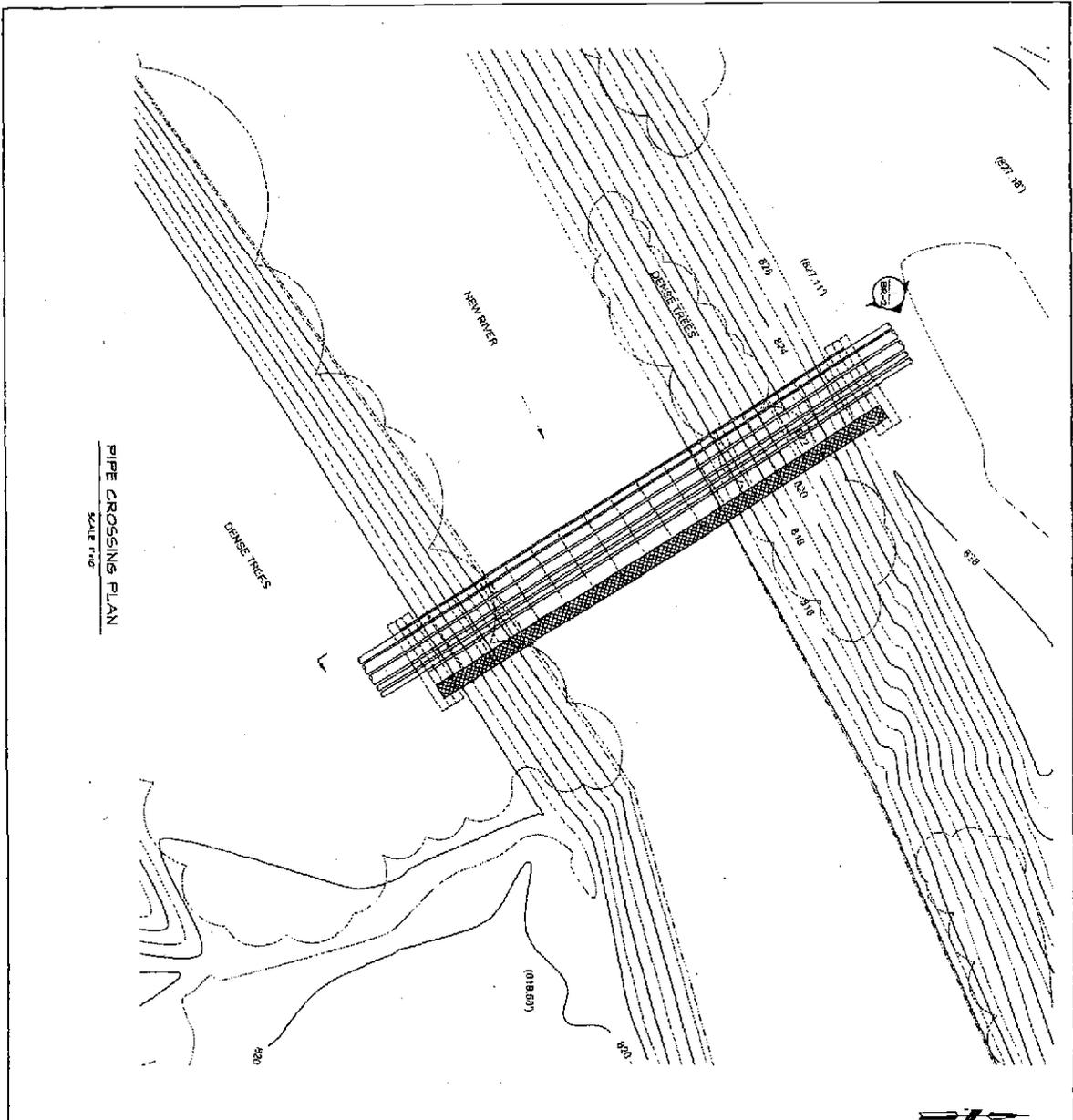
- Proposed Geothermal Development Well Site: ●
- Approved Geothermal Exploration Well Site: ●
- Proposed Geothermal Pipeline Route: —
- Proposed Freshwater Pipeline Route: —
- Proposed New River Crossing: I

Project Area Extents
Shown on the Figure:



0 0.5 1.0
Miles

TN 12°
MIN



PIPE CROSSING PLAN

SCALE 1"=80'

NOT FOR CONSTRUCTION

PRELIMINARY
NOT FOR CONSTRUCTION

PROJECT NO.	BR-1
DATE	11/20/11
SCALE	1"=80'
DESIGNED BY	J. W. WADSWORTH
CHECKED BY	J. W. WADSWORTH
DATE	11/20/11
PROJECT	NEW RIVER PIPE CROSSING
CLIENT	ORMAT NEVADA INC.
LOCATION	IMPERIAL COUNTY, CALIFORNIA

NO.	DESCRIPTION	DATE
1	ISSUED FOR PERMITS	11/20/11
2	ISSUED FOR CONSTRUCTION	
3	ISSUED FOR AS-BUILT	

NEW RIVER PIPE CROSSING PLAN
EAST BRAWLEY PROJECT
 PREPARED FOR
 ORMAT NEVADA INC.

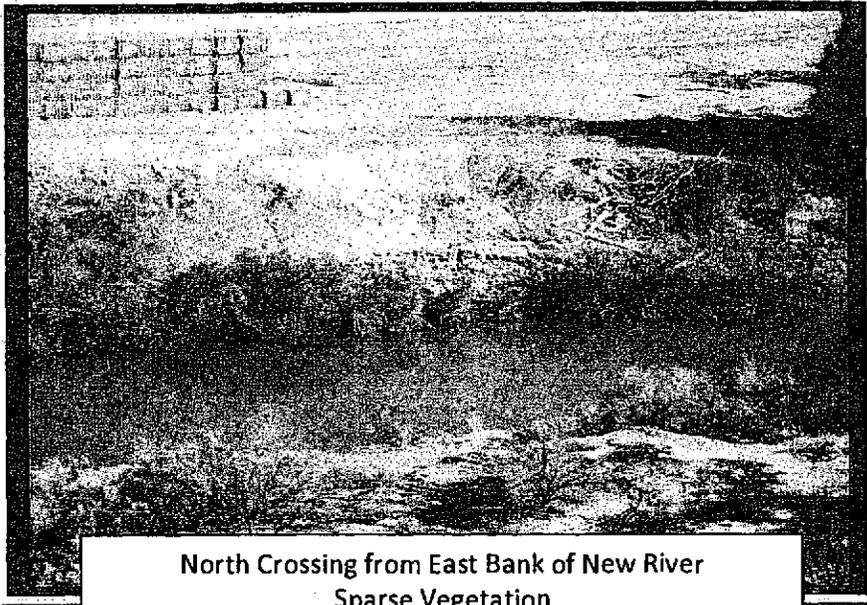
BRAWLEY IMPERIAL COUNTY CALIFORNIA

tobey wade
CONSULTING
 329 Flint Street
 Reno, Nevada 89501
 Tel. (775) 324-7757 Fax (775) 324-7797

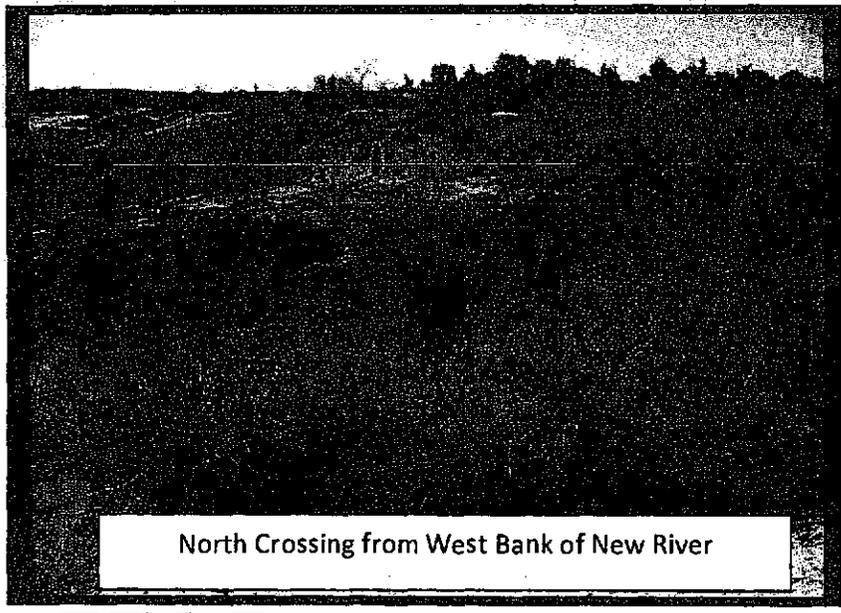


**LOCATIONS EVALUATED FOR PIPELINE CROSSING
OF THE
NEW RIVER**

PIPE CROSSING
PHOTOGRAPHS

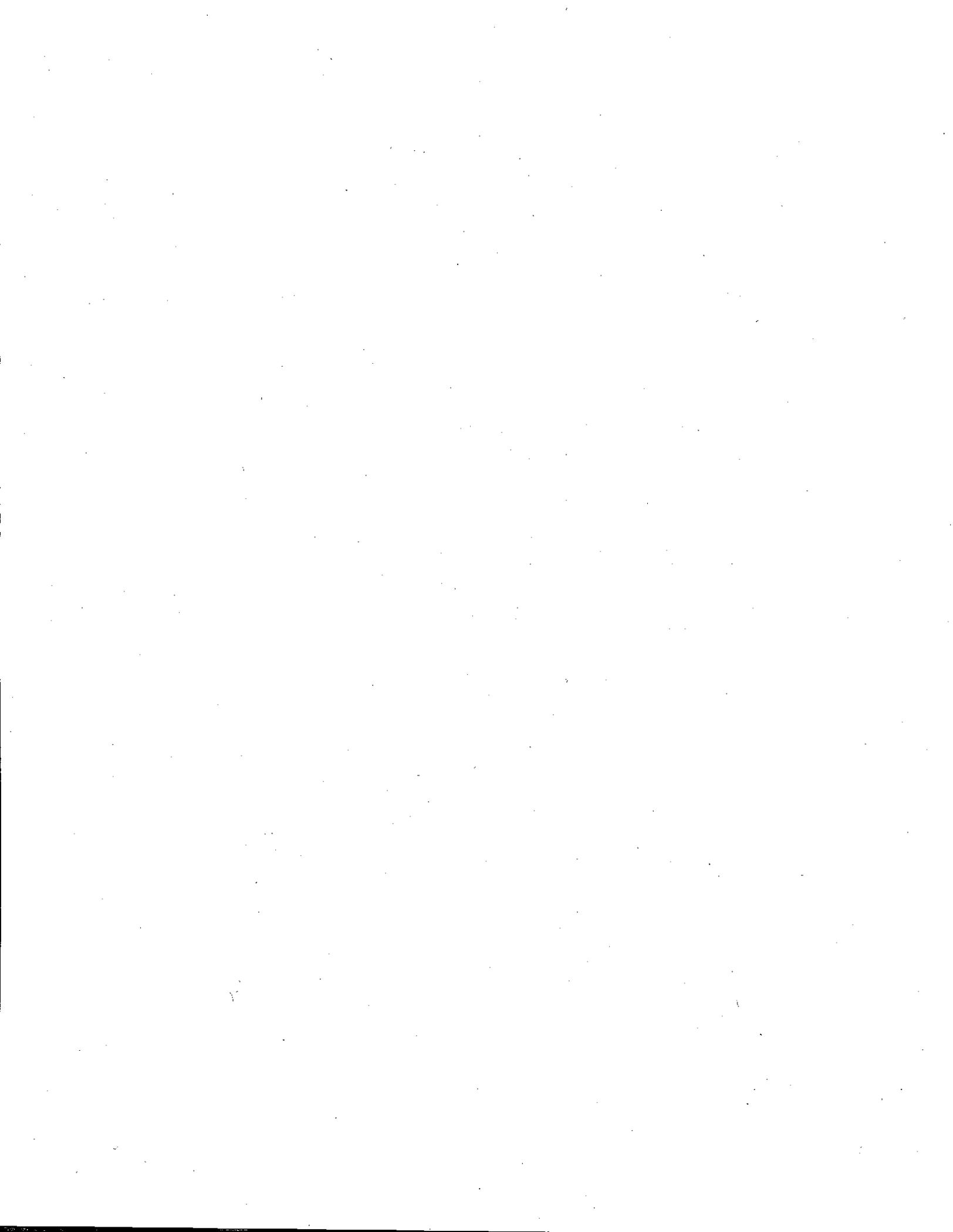


North Crossing from East Bank of New River
Sparse Vegetation



North Crossing from West Bank of New River

EXHIBIT 6



ORMAT®



September 17, 2007

Mr. William S. Brunet, P.E.
Director of Public Works
County of Imperial Public Works Department
155 South 11th Street
El Centro, CA 92243-2853

Re: North Brawley Geothermal Development Project – Mitigation Measures from the
Public Works Department

Dear Mr. Brunet:

Thank you for meeting with me on Wednesday, September 12, 2007 to discuss the Department's letter dated August 29, 2007 concerning mitigation for this proposed project. As we discussed, the following items will be changed:

Item 2 - a de-acceleration and acceleration lane will be required on Hovley at the driveway entrance to the power plant site. The length of the de-acceleration lane will be recommended by Mr. Bill Darnell, Traffic Engineer, in his Traffic Report. The acceleration lane leaving the plant driveway to the north will be designed to adequately avoid the dirt drain at the north end of the field.

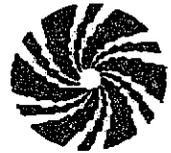
Item 3 - Forty-two (42) feet of right-of-way on Hovley will be required only along the power plant boundary. (This will overlay the IID easement for their 92-kV transmission line if allowed.)

Item 4 - An irrevocable offer of dedication (IOD) for the northern most 30-feet of the property for a distance of approximately 700 feet from the center line of Hovley Road to the end of the power plant boundary where Andre Road would be if it extended from Hovley to Highway 111. It is not clear where Andre Road "is" as there is a dirt road on the north side of the field where the power plant is proposed, then the Spruce 3 Drain, another dirt road and then Spruce Lateral 3. We need your help in clarifying the IOD location.

ORMAT Nevada

6225 Neil Road, Suite 300, Reno, NV, 89511 • Telephone (775) 356-9029 • Facsimile (775) 356-9039

ORMAT®



Thank you for your assistance with these issues. Please call me at 775-336-0155 if you have any questions or need more information.

Sincerely,

Charlene L Wardlow

Charlene L. Wardlow
Environmental/Regulatory Affairs Administrator

cc: Bill Darnell, Darnell & Associates, Inc.
Jurg Heuberger, Planning Director
Bill Sherman, Ormat Nevada Inc.
Bob Sullivan, Ormat Nevada Inc.

ORMAT Nevada

6225 Neil Road, Suite 300, Reno, NV, 89511 • Telephone (775) 356-9029 • Facsimile (775) 356-9039

➤ Existing traffic counts

Intersection Turning Movement

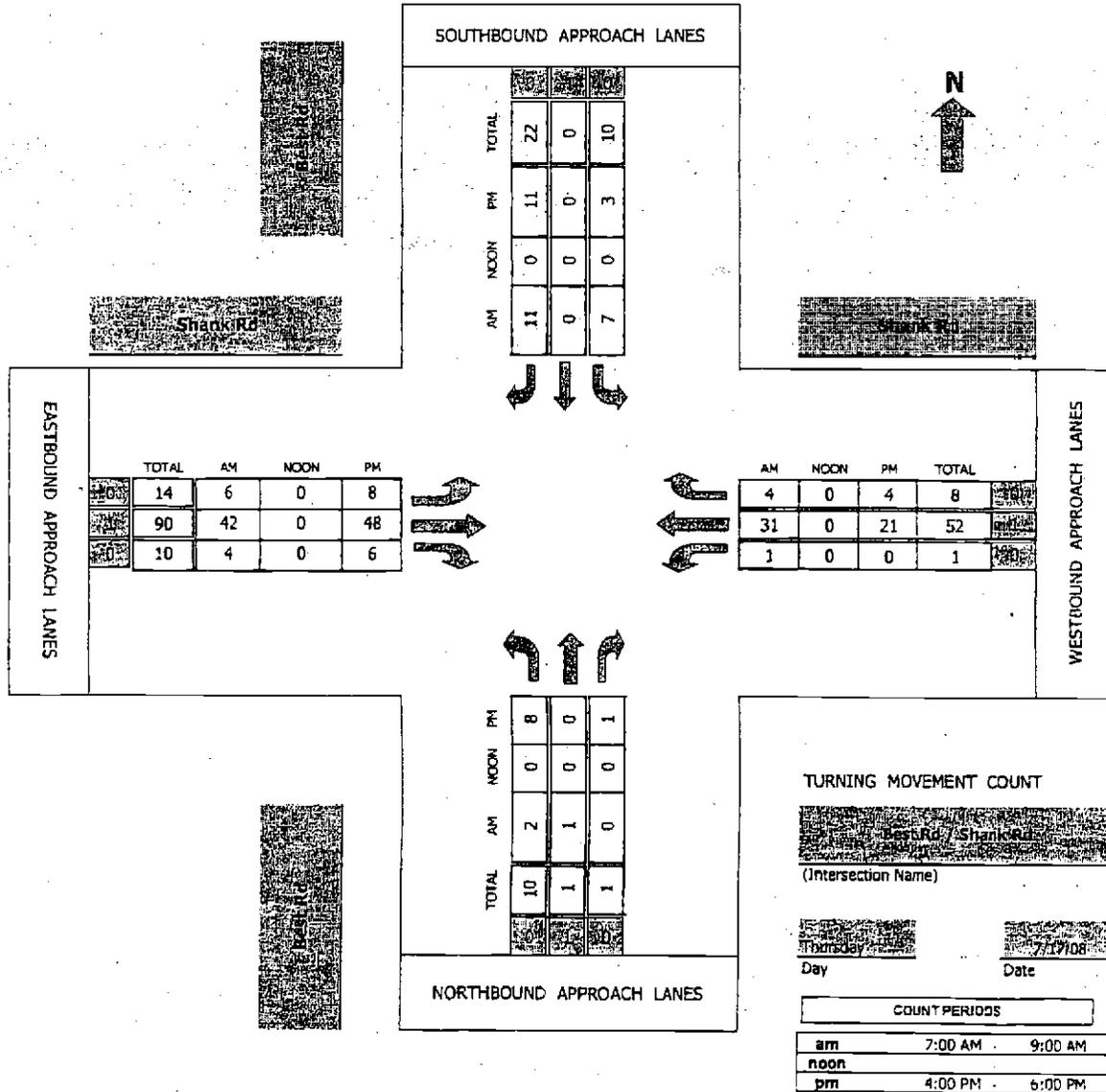
Prepared by:



National Data & Surveying Services

TMC Summary of Best Rd/Shank Rd

Project #: 08-4184-001



CONTROL: 4 Way Stop

AM PEAK HOUR: 800 AM
 NOON PEAK HOUR: 0 AM
 PM PEAK HOUR: 400 PM

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-S STREET: Best Rd

DATE: 7/17/2008

LOCATION: City of Brawley

E-W STREET: Shank Rd

DAY: THURSDAY

PROJECT# 08-4184-001

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	0	1	0	0	1	0	0	1	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	0		0		0	0	2	0	0	7	1	10
7:15 AM	0	0		1		0	0	5	1	0	8	0	15
7:30 AM	0	0		0		1	1	8	0	0	5	1	16
7:45 AM	0	0		1		5	2	11	0	0	7	0	26
8:00 AM	0	1		2		2	1	4	1	0	4	0	15
8:15 AM	2	0		3		5	2	12	2	0	6	2	34
8:30 AM	0	0		1		2	1	16	1	1	10	1	33
8:45 AM	0	0		1		2	2	10	0	0	11	1	27
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	2	1	0	9	0	17	9	68	5	1	58	6	176

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	2	1	0	7	0	11	6	42	4	1	31	4	109
PEAK HR. FACTOR:	0.375			0.563			0.722			0.750			0.801

CONTROL: 4 Way Stop

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-S STREET: Best Rd

DATE: 7/17/2008

LOCATION: City of Brawley

E-W STREET: Shank Rd

DAY: THURSDAY

PROJECT# 08-4184-001

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
1:00 PM	0	1	0	0	1	0	0	1	0	0	1	0	
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	0		0	1		1	0	5	0		9	0	16
4:15 PM	5		0	0		4	0	16	1		4	0	30
4:30 PM	2		1	1		5	4	21	4		4	4	46
4:45 PM	1		0	1		1	4	6	1		4	0	18
5:00 PM	0		0	0		3	2	2	0		4	0	11
5:15 PM	0		0	1		1	1	3	1		6	0	13
5:30 PM	0		0	0		2	1	2	0		1	0	6
5:45 PM	0		0	0		1	1	4	0		4	0	10
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL VOLUMES =	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	8	0	1	4	0	18	13	59	7	0	36	4	150

PM Peak Hr Begins at: 400 PM

PEAK VOLUMES =	8	0	1	3	0	11	8	48	6	0	21	4	110
PEAK HR. FACTOR:		0.450			0.583			0.534			0.694		0.598

CONTROL: 4 Way Stop

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-5 STREET:

DATE:

LOCATION:

E-W STREET:

DAY: NEED DATE

PROJECT#

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
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4:00 PM													
4:15 PM													
4:30 PM													
4:45 PM													
5:00 PM													

TOTAL VOLUMES =	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0

NOON Peak Hr Begins at: 0 AM

PEAK VOLUMES =	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR. FACTOR:	0.000			0.000			0.000			0.000			0.000

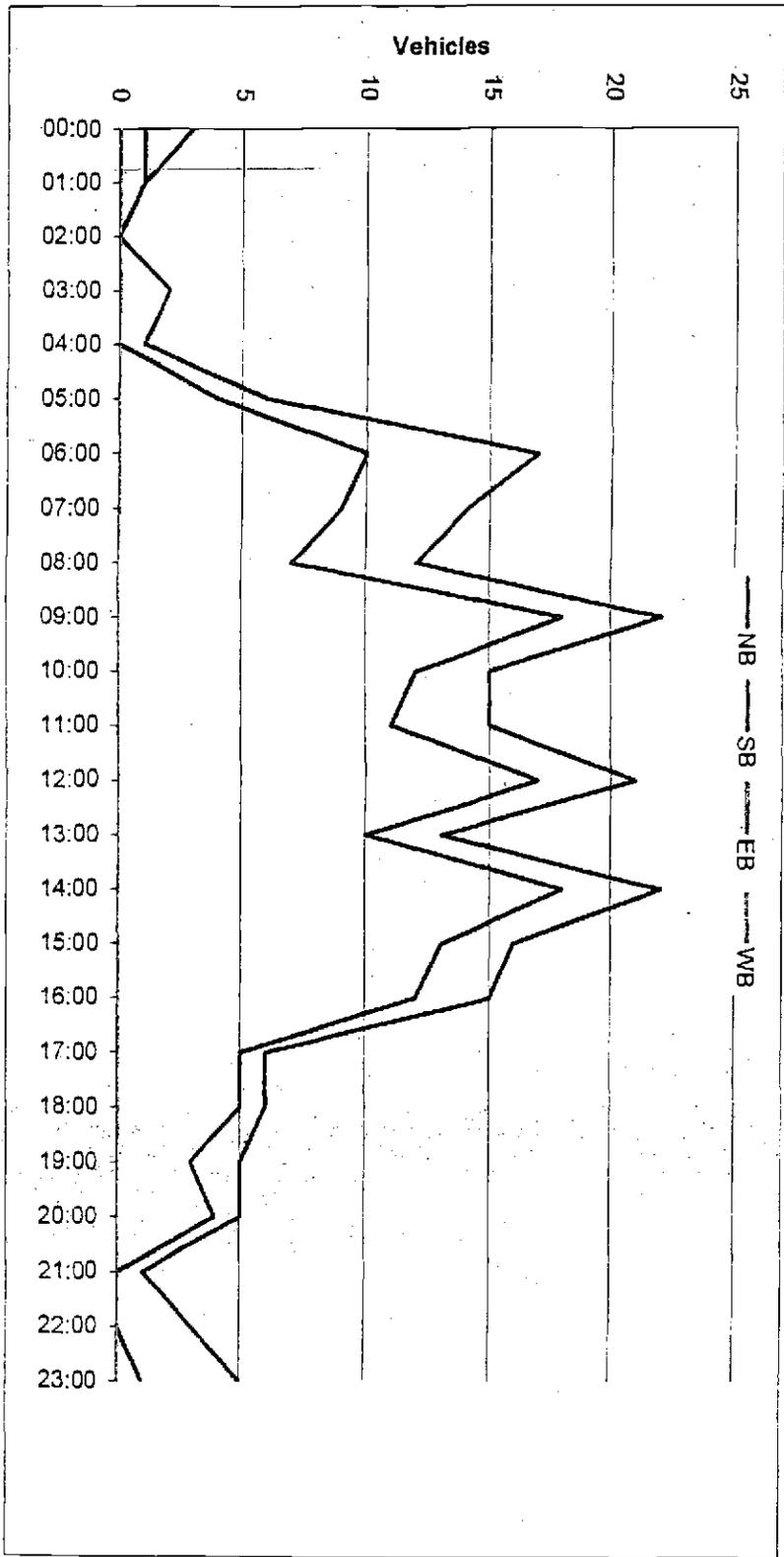
CONTROL:

Volumes for: Thursday, July 17, 2008 City: Brawley Project #: 08-4185-001
 Location: Best Rd. N/o Shank Rd

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	0	0			12:00	6	7		
00:15	1	2			12:15	3	4		
00:30	0	0			12:30	5	6		
00:45	0	1	1	3	12:45	3	17	4	21
01:00	0	0			13:00	3	4		
01:15	0	0			13:15	1	2		
01:30	0	0			13:30	2	2		
01:45	1	1	1	1	13:45	4	10	5	13
02:00	0	0			14:00	8	10		
02:15	0	0			14:15	5	6		
02:30	0	0			14:30	2	2		
02:45	0	0	0	0	14:45	3	18	4	22
03:00	0	0			15:00	4	5		
03:15	0	1			15:15	2	2		
03:30	0	1			15:30	4	5		
03:45	0	0	0	2	15:45	3	13	4	16
04:00	0	0			16:00	1	1		
04:15	0	0			16:15	2	2		
04:30	0	1			16:30	6	8		
04:45	0	0	0	1	16:45	3	12	4	15
05:00	0	0			17:00	2	2		
05:15	1	2			17:15	2	2		
05:30	1	1			17:30	0	1		
05:45	2	4	3	6	17:45	1	5	1	6
06:00	1	3			18:00	2	2		
06:15	2	4			18:15	1	1		
06:30	2	3			18:30	0	1		
06:45	5	10	7	17	18:45	2	5	2	6
07:00	4	6			19:00	1	1		
07:15	1	2			19:15	1	1		
07:30	2	3			19:30	1	2		
07:45	2	9	3	14	19:45	0	3	1	5
08:00	1	2			20:00	1	2		
08:15	3	5			20:15	1	1		
08:30	2	3			20:30	1	1		
08:45	1	7	2	12	20:45	1	4	1	5
09:00	4	5			21:00	0	1		
09:15	6	7			21:15	0	0		
09:30	3	4			21:30	0	0		
09:45	5	18	6	22	21:45	0	0	0	1
10:00	3	4			22:00	0	1		
10:15	3	4			22:15	0	1		
10:30	5	6			22:30	0	0		
10:45	1	12	1	15	22:45	0	0	1	3
11:00	3	4			23:00	0	1		
11:15	2	3			23:15	1	2		
11:30	5	6			23:30	0	1		
11:45	1	11	2	15	23:45	0	1	1	5
Total Vol.	73	108			181	88	118		206

Daily Totals				
NB	SB	EB	WB	
181	206			387

A-10



Project #: 08-4185-001
City: Brawley
Location: Best Rd N/o Shank Rd
Date: Thursday, July 17, 2008

Volumes for: Thursday, July 17, 2008 City: Brawley Project #: 08-4185-003
 Location: Shank Rd E/o Best Rd

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB			
00:00			1	0	12:00			8	5			
00:15			3	3	12:15			14	5			
00:30			4	0	12:30			10	3			
00:45			2	10	2	5	15	5	37	2	15	52
01:00			1	1	13:00			12	3			
01:15			1	0	13:15			10	3			
01:30			1	0	13:30			8	5			
01:45			3	6	2	3	9	2	32	3	14	46
02:00			0	0	14:00			11	2			
02:15			4	5	14:15			10	3			
02:30			1	1	14:30			11	2			
02:45			3	8	5	11	19	31	63	4	11	74
03:00			1	2	15:00			47	2			
03:15			3	1	15:15			28	4			
03:30			0	1	15:30			31	3			
03:45			3	7	4	8	15	12	118	3	12	130
04:00			4	5	16:00			5	5			
04:15			2	7	16:15			15	6			
04:30			1	4	16:30			19	5			
04:45			8	15	3	19	34	7	46	4	20	66
05:00			5	7	17:00			2	5			
05:15			9	10	17:15			5	7			
05:30			10	4	17:30			2	5			
05:45			9	33	2	23	56	4	13	4	21	34
06:00			18	7	18:00			3	2			
06:15			15	14	18:15			4	1			
06:30			11	5	18:30			1	0			
06:45			22	66	12	38	104	4	12	2	5	17
07:00			11	12	19:00			2	1			
07:15			5	5	19:15			3	3			
07:30			7	5	19:30			6	2			
07:45			12	35	9	31	66	4	15	0	6	21
08:00			7	3	20:00			5	0			
08:15			14	12	20:15			0	0			
08:30			15	9	20:30			1	0			
08:45			7	43	11	35	78	3	9	2	2	11
09:00			7	6	21:00			0	0			
09:15			7	6	21:15			1	1			
09:30			10	3	21:30			0	7			
09:45			13	37	11	26	63	1	2	0	8	10
10:00			9	5	22:00			0	0			
10:15			7	5	22:15			2	0			
10:30			9	10	22:30			1	2			
10:45			5	30	6	26	56	0	3	0	2	5
11:00			5	4	23:00			2	2			
11:15			6	1	23:15			1	2			
11:30			10	3	23:30			4	0			
11:45			11	32	2	10	42	0	7	1	5	12

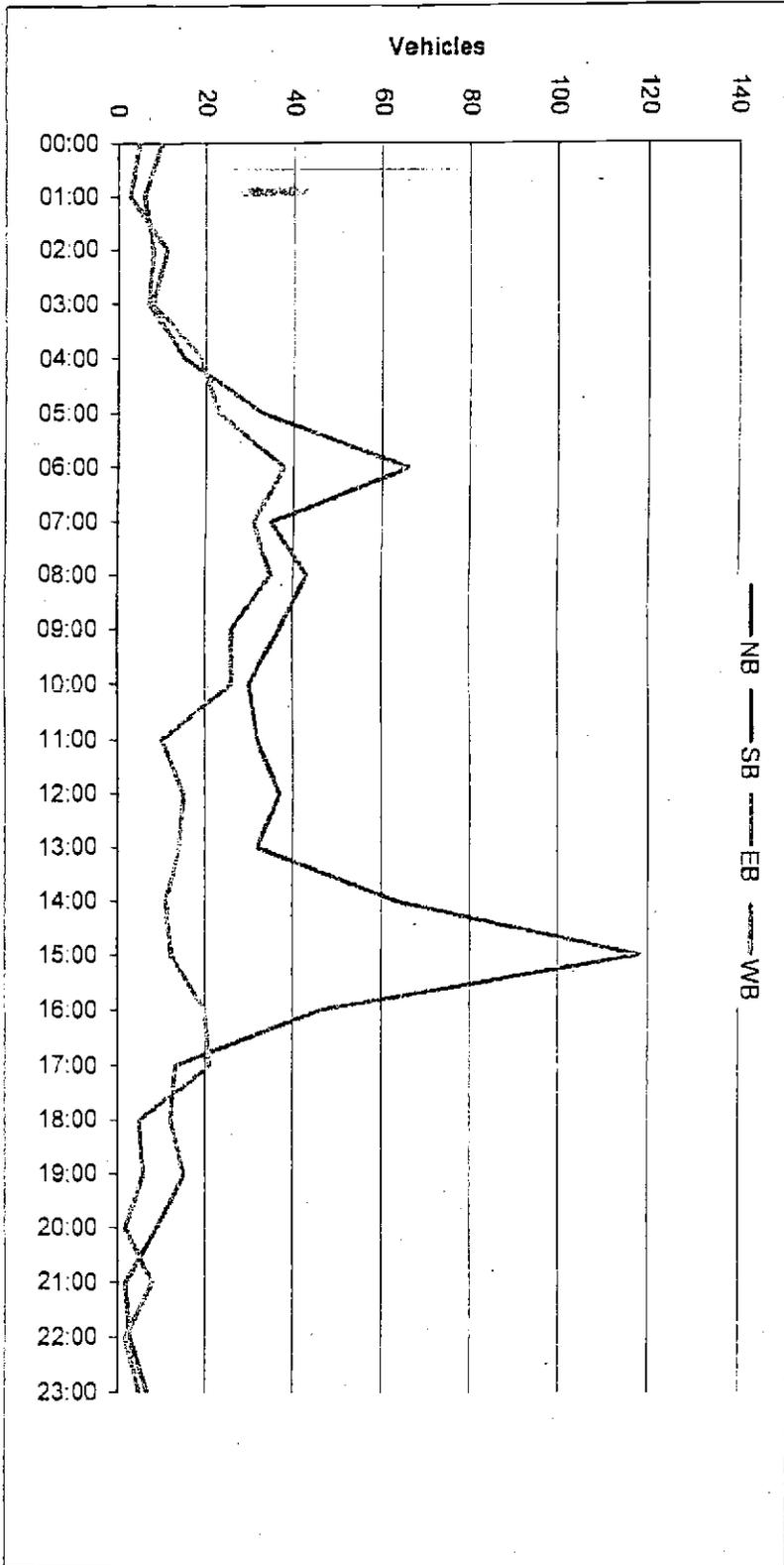
Total Vol. 322 235 557 357 121 476

Daily Totals					
NB	SB	EB	WB		
				670	365
1035					

Project #: 08-4185-003
Location: Shank Rd E/o Best Rd

City: Brawley
Date: Thursday, July 17, 2008

A-12



Prepared by NDS/ATD

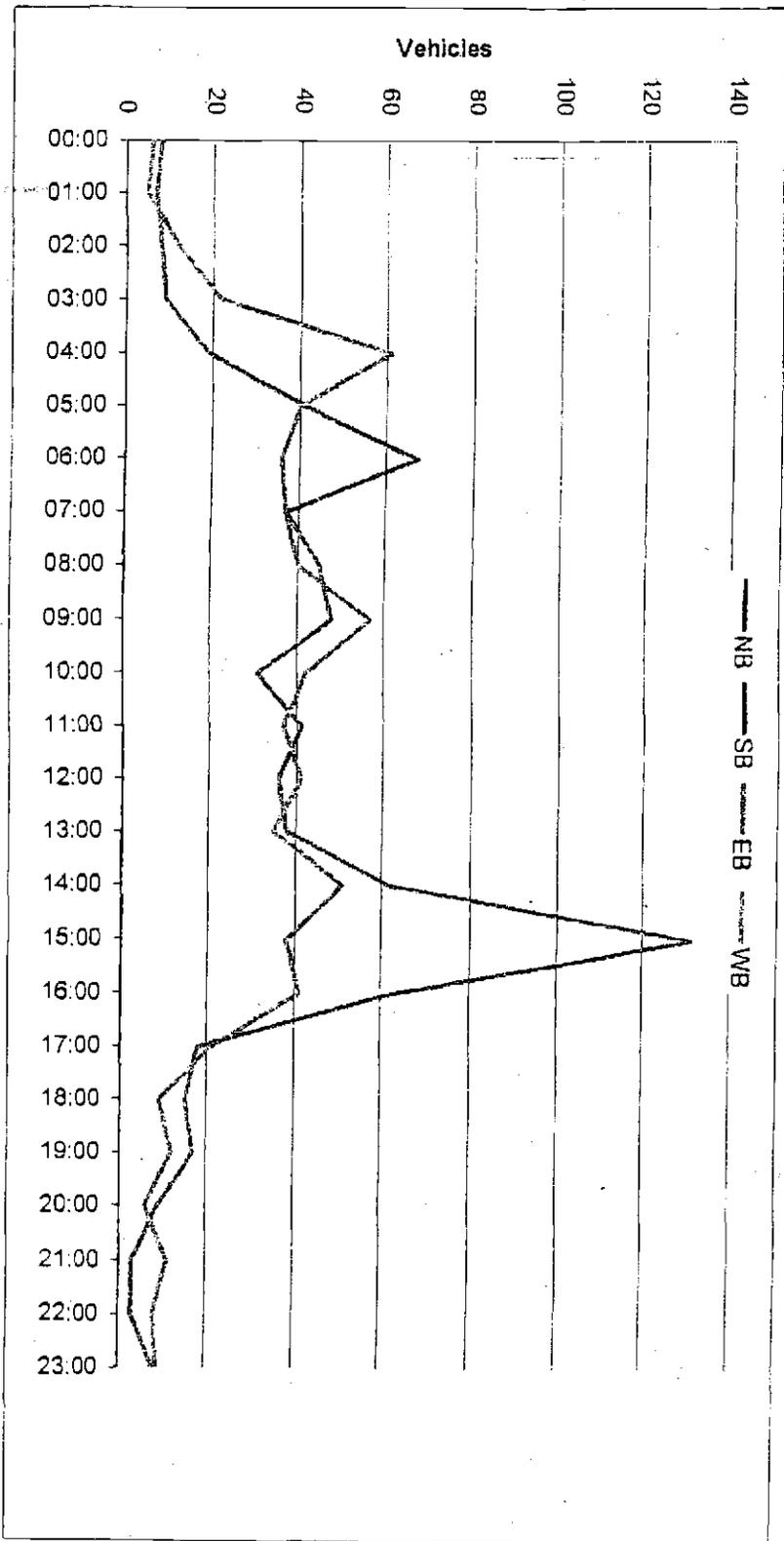
Volumes for: Thursday, July 17, 2008				City: Brawley				Project #: 08-4185-002					
Location: Shank Rd W/o Best Rd													
AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB				
00:00			2	0	12:00			11	11				
00:15			1	4	12:15			11	10				
00:30			4	0	12:30			9	13				
00:45			1	8	2	6	14	12:45	5	36	7	41	77
01:00			1	3	13:00			13	7				
01:15			1	0	13:15			11	7				
01:30			1	0	13:30			10	8				
01:45			4	7	2	5	12	13:45	4	38	13	35	73
02:00			0	1	14:00			7	12				
02:15			3	4	14:15			9	10				
02:30			2	2	14:30			12	14				
02:45			3	8	5	12	20	14:45	34	62	15	51	113
03:00			1	3	15:00			50	10				
03:15			3	5	15:15			27	10				
03:30			1	6	15:30			37	10				
03:45			4	9	8	22	31	15:45	17	131	8	38	169
04:00			4	10	16:00			5	10				
04:15			3	20	16:15			20	12				
04:30			3	14	16:30			27	13				
04:45			9	19	17	61	80	16:45	10	62	6	41	103
05:00			9	14	17:00			4	6				
05:15			11	9	17:15			6	8				
05:30			10	8	17:30			4	2				
05:45			11	41	9	40	81	17:45	4	18	5	21	39
06:00			16	3	18:00			3	3				
06:15			16	9	18:15			6	1				
06:30			11	9	18:30			1	3				
06:45			24	67	15	36	103	18:45	5	15	2	9	24
07:00			14	14	19:00			2	5				
07:15			5	8	19:15			4	5				
07:30			8	6	19:30			6	2				
07:45			10	37	9	37	74	19:45	5	17	0	12	29
08:00			7	6	20:00			3	1				
08:15			15	13	20:15			0	2				
08:30			14	11	20:30			2	2				
08:45			9	45	10	40	85	20:45	4	9	1	6	15
09:00			9	13	21:00			1	0				
09:15			14	15	21:15			1	2				
09:30			12	12	21:30			0	9				
09:45			13	48	17	57	105	21:45	1	3	0	11	14
10:00			7	12	22:00			0	0				
10:15			7	8	22:15			2	2				
10:30			13	13	22:30			1	3				
10:45			4	31	9	42	73	22:45	0	3	3	8	11
11:00			7	14	23:00			3	4				
11:15			10	6	23:15			1	1				
11:30			15	5	23:30			4	1				
11:45			9	41	12	37	78	23:45	0	8	3	9	17

Total Vol.			351	995	756			402	282	684		
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Daily Totals											
			NB	SB	EB	WB					
			756	995	402	282					
			1440								

Prepared by: NDS/ATD
 Project #: 08-4185-002
 Location: Shank Rd W/o Best Rd
 City: Brawley
 Date: Thursday, July 17, 2008

A-14



APPENDIX B
➤ HCS Worksheets
- Existing
-Existing Plus Project
-Existing Plus Construction Traffic

➤ HCS Worksheets - Existing

ALL-WAY STOP CONTROL ANALYSIS									
General Information					Site Information				
Analyst		Justin			Intersection		Best Road and Shank Road		
Agency/Co.		Dermell & Associates			Jurisdiction		Imperial County		
Date Performed		8/18/2008			Analysis Year		2008		
Analysis Time Period		8:00 - 9:00 AM							
Project ID 080306- Existing Conditions									
East/West Street: Shank Road					North/South Street: Best Road				
Volume Adjustments and Site Characteristics									
Approach		Eastbound				Westbound			
Movement		L	T	R	L	T	R		
Volume (veh/h)		6	42	4	1	31	4		
%Thrus Left Lane									
Approach		Northbound				Southbound			
Movement		L	T	R	L	T	R		
Volume (veh/h)		2	1	0	7	0	11		
%Thrus Left Lane									
		Eastbound		Westbound		Northbound		Southbound	
		L1	L2	L1	L2	L1	L2	L1	L2
Configuration		LTR		LTR		LTR		LTR	
PHF		1.00		1.00		1.00		1.00	
Flow Rate (veh/h)		52		36		3		18	
% Heavy Vehicles		0		0		0		0	
No. Lanes		1		1		1		1	
Geometry Group		1		1		1		1	
Duration, T		0.25							
Saturation Headway Adjustment Worksheet									
Prop. Left-Turns		0.1		0.0		0.7		0.4	
Prop. Right-Turns		0.1		0.1		0.0		0.6	
Prop. Heavy Vehicle		0.0		0.0		0.0		0.0	
hLT-adj		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj		-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj		1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
nadj, computed		-0.0		-0.1		0.1		-0.3	
Departure Headway and Service Time									
hd, initial value (s)		3.20		3.20		3.20		3.20	
x, initial		0.05		0.03		0.00		0.02	
hd, final value (s)		3.95		3.93		4.24		3.80	
x, final value		0.06		0.04		0.00		0.02	
Move-up time, m (s)		2.0		2.0		2.0		2.0	
Service Time, t _s (s)		2.0		1.9		2.2		1.8	
Capacity and Level of Service									
		Eastbound		Westbound		Northbound		Southbound	
		L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)		302		286		253		268	
Delay (s/veh)		7.19		7.09		7.25		6.87	
LOS		A		A		A		A	
Approach: Delay (s/veh)		7.19		7.09		7.25		6.87	
LOS		A		A		A		A	
Intersection Delay (s/veh)		7.11							
Intersection LOS		A							

ALL-WAY STOP CONTROL ANALYSIS								
General Information				Site Information				
Analyst	Justin			Intersection	Best Road and Shank Road			
Agency/Co.	Darnell & Associates			Jurisdiction	Imperial County			
Date Performed	8/18/2008			Analysis Year	2008			
Analysis Time Period	4:00 - 5:00 PM							
Project ID Existing Conditions								
East/West Street: Shank Road				North/South Street: Best Road				
Volume Adjustments and Site Characteristics								
Approach	Eastbound			Westbound				
Movement	L	T	R	L	T	R		
Volume (veh/h)	8	48	6	0	21	4		
%Thrus Left Lane								
Approach	Northbound			Southbound				
Movement	L	T	R	L	T	R		
Volume (veh/h)	8	0	1	3	0	11		
%Thrus Left Lane								
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	1.00		1.00		1.00		1.00	
Flow Rate (veh/h)	62		25		9		14	
% Heavy Vehicles	0		0		0		0	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							
Saturation Headway Adjustment Worksheet								
Prop. Left-Turns	0.1		0.0		0.9		0.2	
Prop. Right-Turns	0.1		0.2		0.1		0.8	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		-0.1		0.1		-0.4	
Departure Headway and Service Time								
hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.06		0.02		0.01		0.01	
hd, final value (s)	3.94		3.91		4.21		3.66	
x, final value	0.07		0.03		0.01		0.01	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t _s (s)	1.9		1.9		2.2		1.7	
Capacity and Level of Service								
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	312		275		259		264	
Delay (s/veh)	7.22		7.02		7.25		6.72	
LOS	A		A		A		A	
Approach: Delay (s/veh)	7.22		7.02		7.25		6.72	
LOS	A		A		A		A	
Intersection Delay (s/veh)	7.11							
Intersection LOS	A							

➤ HCS Worksheets -Existing Plus Project

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Justin			Intersection	Project Acces & Best Road			
Agency/Co.	Darnell & Associates			Jurisdiction	Imperial County			
Date Performed	8/26/2008			Analysis Year	2008			
Analysis Time Period	8:00-9:00 AM							
Project Description 080306- Existing + Project								
East/West Street: Project Access				North/South Street: Best Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	16	0			0	3		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	16	0	0	0	0	3		
Percent Heavy Vehicles	0	-	-	0	-	-		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	1	0	0	1	0		
Configuration	L	T				TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	0		1					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	0	1	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach	N			N				
Storage	0			0				
RT Channelized	0			0				
Lanes	0	0	0	0	0	0		
Configuration	LR							
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
v (veh/h)	16						1	
C (m) (veh/h)	1632						1088	
v/c	0.01						0.00	
95% queue length	0.03						0.00	
Control Delay (s/veh)	7.2						8.3	
LOS	A						A	
Approach Delay (s/veh)	--	--					8.3	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	Justin			Intersection	Project Acces & Best Road		
Agency/Co.	Darnell & Associates			Jurisdiction	Imperial County		
Date Performed	8/26/2008			Analysis Year	2008		
Analysis Time Period	4:00-5:00 PM						
Project Description 080306- Existing + Project							
East/West Street: Project Access				North/South Street: Best Road			
Intersection Orientation: North-South				Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	16	0			0	3	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	16	0	0	0	0	3	
Percent Heavy Vehicles	0	-	-	0	-	-	
Median Type	Undivided						
RT Channelized			0				0
Lanes	1	1	0	0	1	0	
Configuration	L	T					TR
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	3		17				
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	3	0	17	0	0	0	
Percent Heavy Vehicles	0	0	0	0	0	0	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0				0
Lanes	0	0	0	0	0	0	
Configuration		LR					
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11 12
Lane Configuration	L						LR
v (veh/h)	16						20
C (m) (veh/h)	1632						1066
v/c	0.01						0.02
95% queue length	0.03						0.06
Control Delay (s/veh)	7.2						8.4
LOS	A						A
Approach Delay (s/veh)	--	--					8.4
Approach LOS	--	--					A

ALL-WAY STOP CONTROL ANALYSIS									
General Information					Site Information				
Analyst	Justin				Intersection	Best Road and Shank Road			
Agency/Co.	Darnell & Associates				Jurisdiction	Imperial County			
Date Performed	8/18/2008				Analysis Year	2008			
Analysis Time Period	8:00 - 9:00 AM								
Project ID Existing + Project Conditions									
East/West Street: Shank Road					North/South Street: Best Road				
Volume Adjustments and Site Characteristics									
Approach	Eastbound					Westbound			
Movement	L	T	R	L	T	R			
Volume (veh/h)	6	42	4	1	31	4			
%Thrus Left Lane									
Approach	Northbound					Southbound			
Movement	L	T	R	L	T	R			
Volume (veh/h)	2	5	0	7	0	11			
%Thrus Left Lane									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR		LTR		LTR		LTR		
PHF	1.00		1.00		1.00		1.00		
Flow Rate (veh/h)	52		36		7		18		
% Heavy Vehicles	0		0		0		0		
No. Lanes	1		1		1		1		
Geometry Group	1		1		1		1		
Duration, T	0.25								
Saturation Headway Adjustment Worksheet									
Prop. Left-Turns	0.1		0.0		0.3		0.4		
Prop. Right-Turns	0.1		0.1		0.0		0.6		
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0		
nLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
nRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
nHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
nadj, computed	-0.0		-0.1		0.1		-0.3		
Departure Headway and Service Time									
hd, initial value (s)	3.20		3.20		3.20		3.20		
x, initial	0.05		0.03		0.01		0.02		
hd, final value (s)	3.96		3.94		4.16		3.80		
x, final value	0.06		0.04		0.01		0.02		
Move-up time, m (s)	2.0		2.0		2.0		2.0		
Service Time, t _s (s)	2.0		1.9		2.2		1.8		
Capacity and Level of Service									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	302		286		257		268		
Delay (s/veh)	7.20		7.10		7.19		6.88		
LOS	A		A		A		A		
Approach: Delay (s/veh)	7.20		7.10		7.19		6.88		
LOS	A		A		A		A		
Intersection Delay (s/veh)	7.12								
Intersection LOS	A								

ALL-WAY STOP CONTROL ANALYSIS									
General Information					Site Information				
Analyst	Justin				Intersection	Best Road and Shank Road			
Agency/Co.	Darnell & Associates				Jurisdiction	Imperial County			
Date Performed	8/18/2008				Analysis Year	2008			
Analysis Time Period	4:00 - 5:00 PM								
Project ID Existing + Project Conditions									
East/West Street: Shank Road					North/South Street: Best Road				
Volume Adjustments and Site Characteristics									
Approach	Eastbound					Westbound			
Movement	L	T	R	L	T	R			
Volume (veh/h)	8	48	6	0	21	4			
%Thrus Left Lane									
Approach	Northbound					Southbound			
Movement	L	T	R	L	T	R			
Volume (veh/h)	8	4	1	3	4	11			
%Thrus Left Lane									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR		LTR		LTR		LTR		
PHF	1.00		1.00		1.00		1.00		
Flow Rate (veh/h)	62		25		13		18		
% Heavy Vehicles	0		0		0		0		
No. Lanes	1		1		1		1		
Geometry Group	1		1		1		1		
Duration, T	0.25								
Saturation Headway Adjustment Worksheet									
Prop. Left-Turns	0.1		0.0		0.6		0.2		
Prop. Right-Turns	0.1		0.2		0.1		0.6		
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0		
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		-0.1		0.1		-0.3		
Departure Headway and Service Time									
hd, initial value (s)	3.20		3.20		3.20		3.20		
x, initial	0.06		0.02		0.01		0.02		
hd, final value (s)	3.96		3.93		4.18		3.76		
x, final value	0.07		0.03		0.02		0.02		
Move-up time, m (s)	2.0		2.0		2.0		2.0		
Service Time, t _s (s)	2.0		1.9		2.2		1.8		
Capacity and Level of Service									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	312		275		263		268		
Delay (s/veh)	7.25		7.04		7.24		6.83		
LOS	A		A		A		A		
Approach: Delay (s/veh)	7.25		7.04		7.24		6.83		
LOS	A		A		A		A		
Intersection Delay (s/veh)	7.14								
Intersection LOS	A								

ALL-WAY STOP CONTROL ANALYSIS									
General Information					Site Information				
Analyst	Justin				Intersection	Best Road and Shank Road			
Agency/Co.	Darnell & Associates				Jurisdiction	Imperial County			
Date Performed	8/18/2008				Analysis Year	2008			
Analysis Time Period	8:00 - 9:00 AM								
Project ID 080306- Existing + Constr Conditions									
East/West Street: Shank Road					North/South Street: Best Road				
Volume Adjustments and Site Characteristics									
Approach	Eastbound					Westbound			
Movement	L	T	R	L	T	R			
Volume (veh/h)	6	42	4	1	31	4			
%Thrus Left Lane									
Approach	Northbound					Southbound			
Movement	L	T	R	L	T	R			
Volume (veh/h)	2	0	0	7	0	11			
%Thrus Left Lane									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LTR		LTR		LTR		LTR		
PHF	1.00		1.00		1.00		1.00		
Flow Rate (veh/h)	52		36		2		18		
% Heavy Vehicles	0		0		0		0		
No. Lanes	1		1		1		1		
Geometry Group	1		1		1		1		
Duration, T	0.25								
Saturation Headway Adjustment Worksheet									
Prop. Left-Turns	0.1		0.0		1.0		0.4		
Prop. Right-Turns	0.1		0.1		0.0		0.6		
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0		
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		-0.1		0.2		-0.3		
Departure Headway and Service Time									
hd, initial value (s)	3.20		3.20		3.20		3.20		
xs, initial	0.05		0.03		0.00		0.02		
hd, final value (s)	3.95		3.93		4.30		3.80		
xs, final value	0.06		0.04		0.00		0.02		
Move-up time, m (s)	2.0		2.0		2.0		2.0		
Service Time, ts (s)	2.0		1.9		2.3		1.8		
Capacity and Level of Service									
	Eastbound		Westbound		Northbound		Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Capacity (veh/h)	302		286		252		268		
Delay (s/veh)	7.19		7.09		7.31		6.87		
LOS	A		A		A		A		
Approach: Delay (s/veh)	7.19		7.09		7.31		6.87		
LOS	A		A		A		A		
Intersection Delay (s/veh)	7.11								
Intersection LOS	A								

➤ HCS Worksheets - Existing Plus Construction Traffic

TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Justin		Intersection	Project Acces & Best Road				
Agency/Co.	Darnell & Associates		Jurisdiction	Imperial County				
Date Performed	8/26/2008		Analysis Year	2008				
Analysis Time Period	8:00-9:00 AM							
Project Description 080306- Existing +Construction Conditions								
East/West Street: Project Access			North/South Street: Best Road					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	59	0			0	11		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	59	0	0	0	0	11		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	1	0	0	1	0		
Configuration	L	T				TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	0		1					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	0	1	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach	N			N				
Storage	0			0				
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration	LR							
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
v (veh/h)	59						1	
C (m) (veh/h)	1621						1083	
v/c	0.04						0.00	
95% queue length	0.11						0.00	
Control Delay (s/veh)	7.3						8.3	
LOS	A						A	
Approach Delay (s/veh)	--	--					8.3	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Justin			Intersection	Project Acces & Best Road			
Agency/Co.	Darnell & Associates			Jurisdiction	Imperial County			
Date Performed	8/26/2008			Analysis Year	2008			
Analysis Time Period	4:00-5:00 PM							
Project Description 080306- Existing +Construction Conditions								
East/West Street: Project Access				North/South Street: Best Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	16	0			0	3		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	16	0	0	0	0	3		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	1	0	0	1	0		
Configuration	L	T				TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	11		60					
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	11	0	60	0	0	0		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
v (veh/h)	16						71	
C (m) (veh/h)	1632						1069	
v/c	0.01						0.07	
95% queue length	0.03						0.21	
Control Delay (s/veh)	7.2						8.6	
LOS	A						A	
Approach Delay (s/veh)	--	--					8.6	
Approach LOS	--	--					A	

ALL-WAY STOP CONTROL ANALYSIS								
General Information					Site Information			
Analyst	Justin				Intersection	Best Road and Shank Road		
Agency/Co.	Darnell & Associates				Jurisdiction	Imperial County		
Date Performed	8/18/2008				Analysis Year	2008		
Analysis Time Period	4:00 - 5:00 PM							
Project ID 080306- Existing + Constr Conditions								
East/West Street: Shank Road					North/South Street: Best Road			
Volume Adjustments and Site Characteristics								
Approach	Eastbound			Westbound				
Movement	L	T	R	L	T	R		
Volume (veh/h)	8	48	6	0	21	4		
%Thrus Left Lane								
Approach	Northbound			Southbound				
Movement	L	T	R	L	T	R		
Volume (veh/h)	8	4	0	3	14	11		
%Thrus Left Lane								
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	1.00		1.00		1.00		1.00	
Flow Rate (veh/h)	62		25		12		28	
% Heavy Vehicles	0		0		0		0	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							
Saturation Headway Adjustment Worksheet								
Prop. Left-Turns	0.1		0.0		0.7		0.1	
Prop. Right-Turns	0.1		0.2		0.0		0.4	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		-0.1		0.1		-0.2	
Departure Headway and Service Time								
hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.06		0.02		0.01		0.02	
hd, final value (s)	3.98		3.95		4.24		3.88	
x, final value	0.07		0.03		0.01		0.03	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	2.0		1.9		2.2		1.9	
Capacity and Level of Service								
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	312		275		262		278	
Delay (s/veh)	7.27		7.06		7.31		7.00	
LOS	A		A		A		A	
Approach: Delay (s/veh)	7.27		7.06		7.31		7.00	
LOS	A		A		A		A	
Intersection Delay (s/veh)	7.17							
Intersection LOS	A							

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	Justin			Intersection	SR-111 & Best Road		
Agency/Co.	Darnell & Associates			Jurisdiction	Imperial County		
Date Performed	8/26/2008			Analysis Year	2008		
Analysis Time Period	8:00-9:00 AM						
Project Description : 080306- Existing +Construction Conditions							
East/West Street: SR-111				North/South Street: Best Road			
Intersection Orientation: East-West				Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments							
Major Street	Eastbound			Westbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	6	42	4	1	31	4	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	6	42	4	1	31	4	
Percent Heavy Vehicles	0	--	--	0	--	--	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	1	2	0	1	2	0	
Configuration	L	T	TR	L	T	TR	
Upstream Signal		0			0		
Minor Street	Northbound			Southbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	2	5	0	7	0	11	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	
Hourly Flow Rate, HFR (veh/h)	2	5	0	7	0	11	
Percent Heavy Vehicles	0	0	0	0	0	0	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Eastbound	Westbound	Northbound			Southbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	L	L	LTR			LTR	
v (veh/h)	6	1	7			18	
C (m) (veh/h)	1589	1575	824			998	
v/c	0.00	0.00	0.01			0.02	
95% queue length	0.01	0.00	0.03			0.06	
Control Delay (s/veh)	7.3	7.3	9.4			8.7	
LOS	A	A	A			A	
Approach Delay (s/veh)	--	--	9.4			8.7	
Approach LOS	--	--	A			A	

B-14

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Justin			Intersection	SR-111 & Best Road			
Agency/Co.	Darnell & Associates			Jurisdiction	Imperial County			
Date Performed	8/26/2008			Analysis Year	2008			
Analysis Time Period	4:00-5:00 PM							
Project Description 080306- Existing +Construction Conditions								
East/West Street: SR-111				North/South Street: Best Road				
Intersection Orientation: East-West				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	8	48	6	0	21	4		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	8	48	6	0	21	4		
Percent Heavy Vehicles	0	-	-	0	-	-		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	2	0	1	2	0		
Configuration	L	T	TR	L	T	TR		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	8	4	1	3	4	11		
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	8	4	1	3	4	11		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	8	0	13			18		
C (m) (veh/h)	1603	1564	869			971		
v/c	0.00	0.00	0.01			0.02		
95% queue length	0.02	0.00	0.05			0.06		
Control Delay (s/veh)	7.3	7.3	9.2			8.8		
LOS	A	A	A			A		
Approach Delay (s/veh)	-	-	9.2			8.8		
Approach LOS	-	-	A			A		

APPENDIX C
➤ County of Imperial Public Works Department Plan Check #1
Traffic Study Comment Letter

EXHIBIT 7





IMPERIAL COUNTY

PLANNING & DEVELOPMENT SERVICES

PLANNING / BUILDING INSPECTION / ECONOMIC DEVELOPMENT / PLANNING COMMISSION / A.L.U.C.

May 28, 2008

JURG HEUBERGER AICP, CEP, CBO
PLANNING & DEVELOPMENT SERVICES DIRECTOR

Charlene L. Wardlow
Env. Reg. Affairs Administrator
Ormat Nevada, Inc.
6225 Neil Road
Reno, NV 89511

RECEIVED

MAY 29 2008

ORMAT RENO OFFICE

**Subject: Request for Minor Amendment to CUP #07-0017
APN# 037-130-040-000/North Brawley Binary Plant**

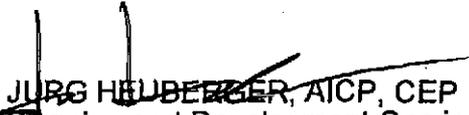
Dear Charlene:

The County Planning and Development Services Department received on May 14, 2008, your request for a "Minor Amendment" to the above permit. The CUP section **G-14, Minor Amendments**, permits the Planning Director to approve minor modifications to the permit on the design, construction and operation of the project. This approval is based upon a determination that the proposed minor changes will not result in any additional environmental impacts.

The proposal is to spread out the binary plant's production and injection islands based on the acquisition of additional leases in the project area. The original well field is proposed to be expanded northward and westward and that ORMAT intends "...to use well pads for more than 1 well, thus, potentially reducing the number of well pads for the project..." ORMAT shall comply with all of the environmental mitigation measures within CUP #07-0017 including the S-6 and S-7 conditions for Archaeological/Cultural/Paleontological Resources and Biological Resources and doing a pre-construction survey for the Burrowing Owl on the proposed new well pads.

If you have any questions, please contact Richard Cabanilla, Planner IV, at (760) 482-4236, extension 4313.

Sincerely,


JURG HEUBERGER, AICP, CEP
Planning and Development Services
Department Director

cc: Darrell Gardner, Asst. Planning & Dev. Services Director
Jim Minnick, County Planning Division Manager
Files: CUP #07-0017/10.101/10.102/10.103/10.105

RC/aa/S: APN FILE 037\130\040\MinorAmendmentLetterORMAT

G-14 MINOR AMENDMENTS:

The Planning Director may approve minor modifications to the permit to accommodate minor changes or modifications to the design, construction, and/or operation of the project provided said changes are necessary for the project to meet other laws, regulations, codes, or conditions of the CUP and provided further, that such changes will not result in any additional environmental impacts.

G-15 SPECIFICITY:

The issuance of this permit does not authorize the Permittee to construct or operate the project in violation of any state, federal, local law nor beyond the specified boundaries of the project as shown the application/project description/permit, nor shall this permit allow any accessory or ancillary use not specified herein. This permit does not provide any prescriptive right or use to the Permittee for future addition and or modifications to the project.

G-16 NON-COMPLIANCE (ENFORCEMENT & TERMINATION):

Should the Permittee violate any condition herein, the County shall give notice of such violation. If Permittee does not act to correct the identified violation and, after having given reasonable notice and opportunity, e.g. typically at least thirty (30) days, the County may revoke the permit.

(a) If the Planning Commission finds and determines that the Permittee or successor-in-interest has not complied with the terms and conditions of the CUP, or cannot comply with the terms and conditions of the CUP, or the Planning Commission determines that the permitted activities constitute a public nuisance, the Planning Director shall provide Permittee with notice and a reasonable opportunity to comply with the enforcement or abatement order;

(b) If after receipt of the order, (1) Permittee fails to comply, and/or (2) Permittee cannot comply with the conditions set forth in the CUP, then the matter shall be referred to the Planning Commission for permit modification suspension, or termination, or to the appropriate prosecuting authority.

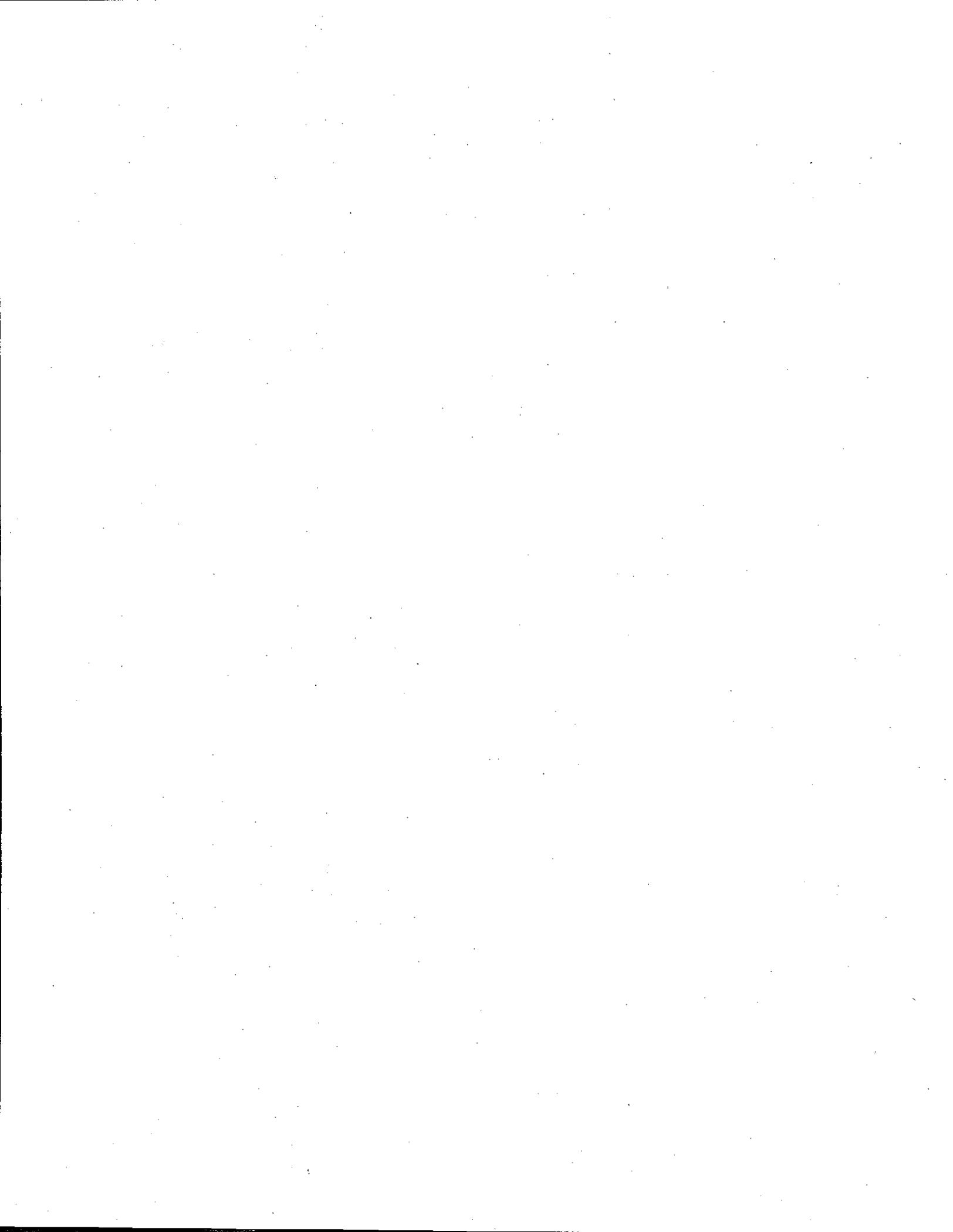
G-17 GENERAL WELFARE:

All construction of the project shall be conducted with consistency with all laws, conditions, adopted County policies, plans and the application so that the project will be in harmony with the area and not conflict with the public health, safety, comfort, convenience, and general welfare.

G-18 PERMITS OF OTHER AGENCIES INCORPORATED:

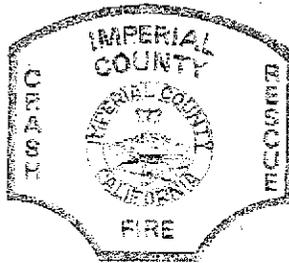
Permits granted by other governmental agencies in connection with the Project are incorporated herein by reference. The County reserves the right to apply conditions of those permits, as the County deems appropriate; provided that enforcement of a permit granted by another agency shall require concurrence by that agency.

EXHIBIT 8



ADMINISTRATION/PREVENTION

1078 Dogwood Road
Heber, CA 92249
Phone: (760) 482-2420
Fax: (760) 482-2427



OPERATIONS/TRAINING

2514 La Brucherie Road
Imperial, CA 92251
Phone: (760) 355-1191
Fax: (760) 355-1482

September 9, 2008

Mr. Jurg Heuberger-Director
Co. Planning & Development
801 Main Street
El Centro, Ca. 92243

RECEIVED

SEP 09 2008

IMPERIAL COUNTY
PLANNING & DEVELOPMENT SERVICES

**Re: ORNI 19 LLC / Ormat Nevada INC.
Conditional Use Permit #08-0023
Assessor's Parcel Number 037-090-006-000,037-100-007,
006, 005, 004, 003, 001, 037-110-004, 005, 007, 009, 015, 016-000
037-120-030, 031, -000, 037-140-002, 006, 009, 013, 014, 015-000
037-150-015, 016, 019-000, 037-160-027-000 & 037-180-009, 011-000**

Dear Mr. Heuberger,

We thank you for the opportunity to comment on the Conditional Use Permit application stated above. However, we feel there are some questions and conditions that need to be addressed before the approval of this application is given.

All buildings shall be protected with an approved automatic suppression-type system, due to the fact of a delayed response time. In reference to the Isopentane tanks (23,000 gallons), it will be required to have a deluge sprinkler system activated when a vapor detector or flame detector is activated.

We will require an analysis of the Gas Scrubber pertaining to Fire Suppression measures needed to protect against the gases that will contain methane and other non-compressible gases at a rate of 28,100 lbs/hr.

There is mention of a 2,500 gpm diesel fire water pump that is proposed as a component of the fire protection system. The capacity of the pump will be determined by the total / combined square footage of all structures located on the premises. There shall also be a back-up pump system required in case of the diesel pump failing.

The water that is used for the power plant operations and drilling may be used for fire suppression. A minimum required water supply, shall remain undisturbed, in a designated storage, readily available to supply fire suppression equipment.

The roads used for the construction of the plant may not be suitable for Fire Apparatus Access. A primary and secondary access road, with all-weather surfacing, will be needed to meet Fire Access requirements.

The required minimum will be based off of the 2007 California Fire Code. Even though there will be plenty of water used in the plant operations, it will not be readily available to the firefighters in an emergency situation. To add the additional water, and make it available, a system transferring the water from the cooling towers to the fire water supply system shall be designed and approved by the Imperial County Fire Prevention Bureau.

We will also reserve our rights to comment at a later time in reference to any required specialized training or suppression equipment.

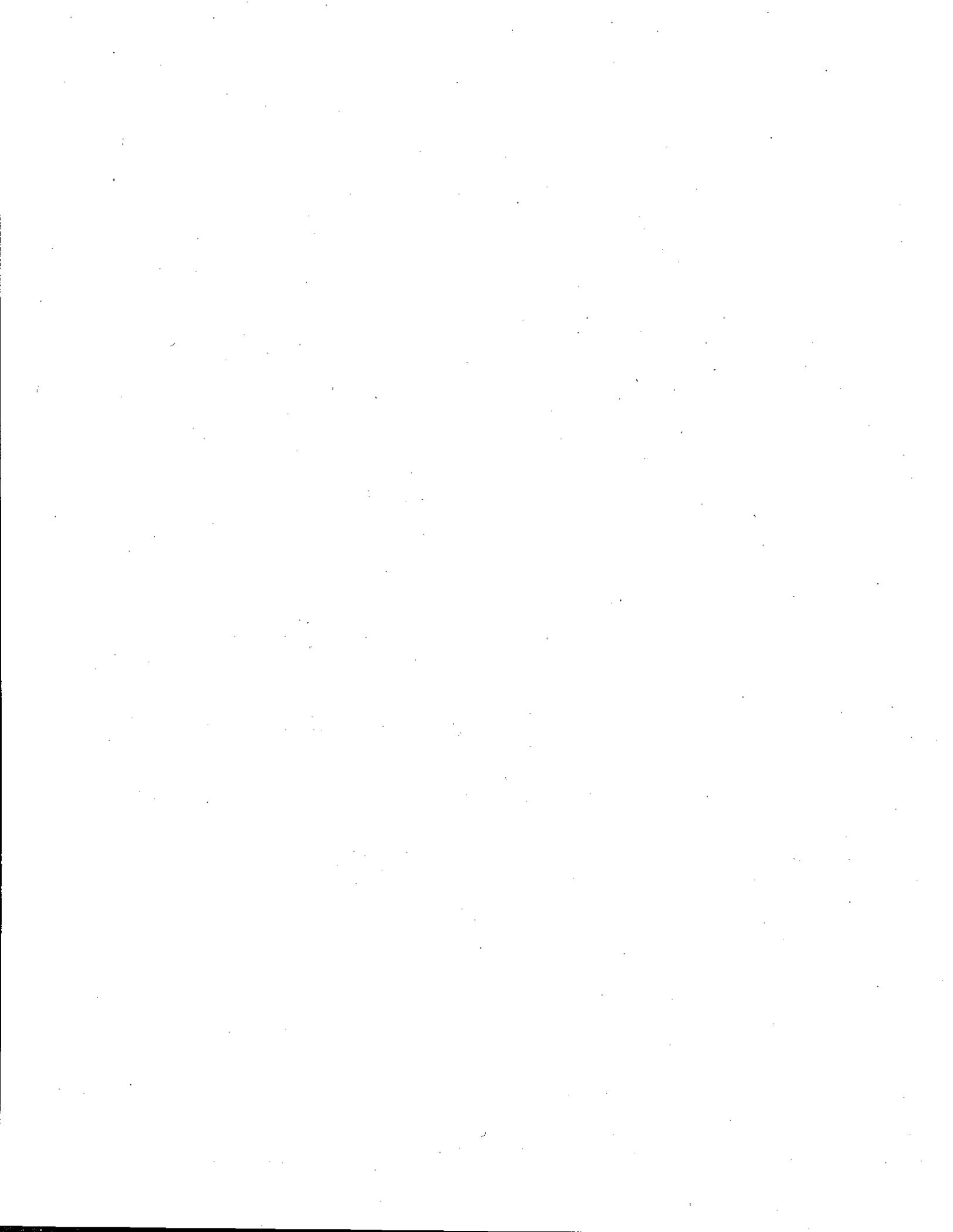
If you have any questions, please contact the Imperial County Fire Prevention Bureau at (760) 482-2429 or 482-2492.

Sincerely,



Johnny M. Romero
Deputy Fire Marshal

EXHIBIT 9





IMPERIAL IRRIGATION DISTRICT

September 15, 2008

FAXED & MAILED

Mr. Jurg Heuberger, Planning Director
Imperial County Planning/Building Dept.
801 Main Street
El Centro, CA 92243

Dear Mr. Heuberger:

Subject: Conditional Use Permit #08-0023, for ORNI 19 LLC/ORMAT Nevada Inc.
Assessor's Parcel Number 037-090-006-000, 037-037-100-007, 006, 005, 004, 003, 001
037-110-004, 005, 007, 009, 015, 016-000 037-120-030, 031-000 037-140-002, 006, 009,
013, 014, 015-000 037-150-015, 016, 019-000 037-160-027-000, & 037-180-009, 011-000

Thank you for the opportunity to comment on the above matter. After reviewing this proposed Conditional Use Permit Application, the following comments are offered.

No significant impacts to the IID Energy Division's facilities are anticipated from this project.

As always, I can be reached at (760) 482-3400.

Sincerely,

For CARLTON L. KING
Superintendent, Customer Operations
Energy Services

CLK:1

OR Gas Co. Dist. Impact Letter: ORNI 19 LLC/ORMAT NEVADA INC. ltr

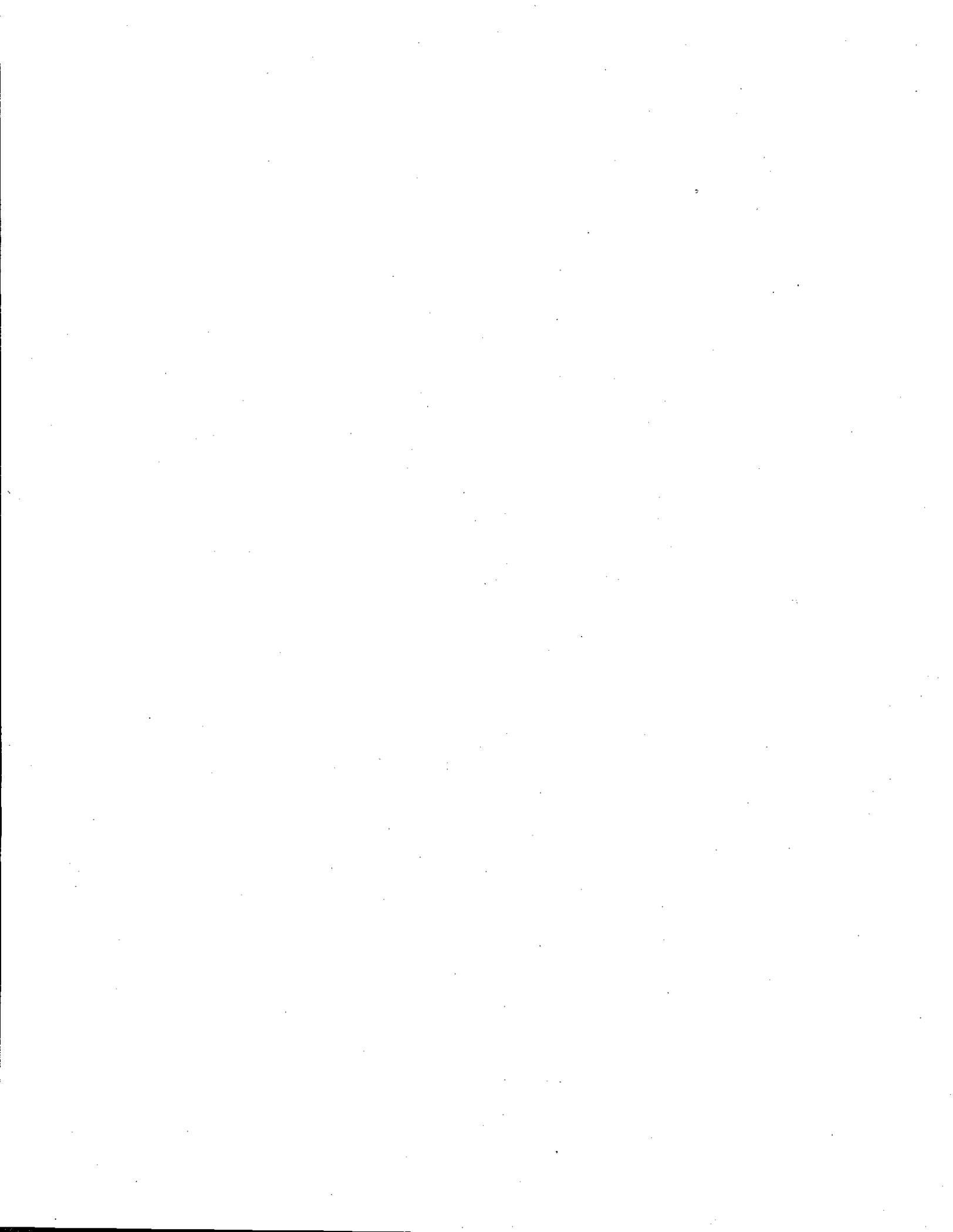
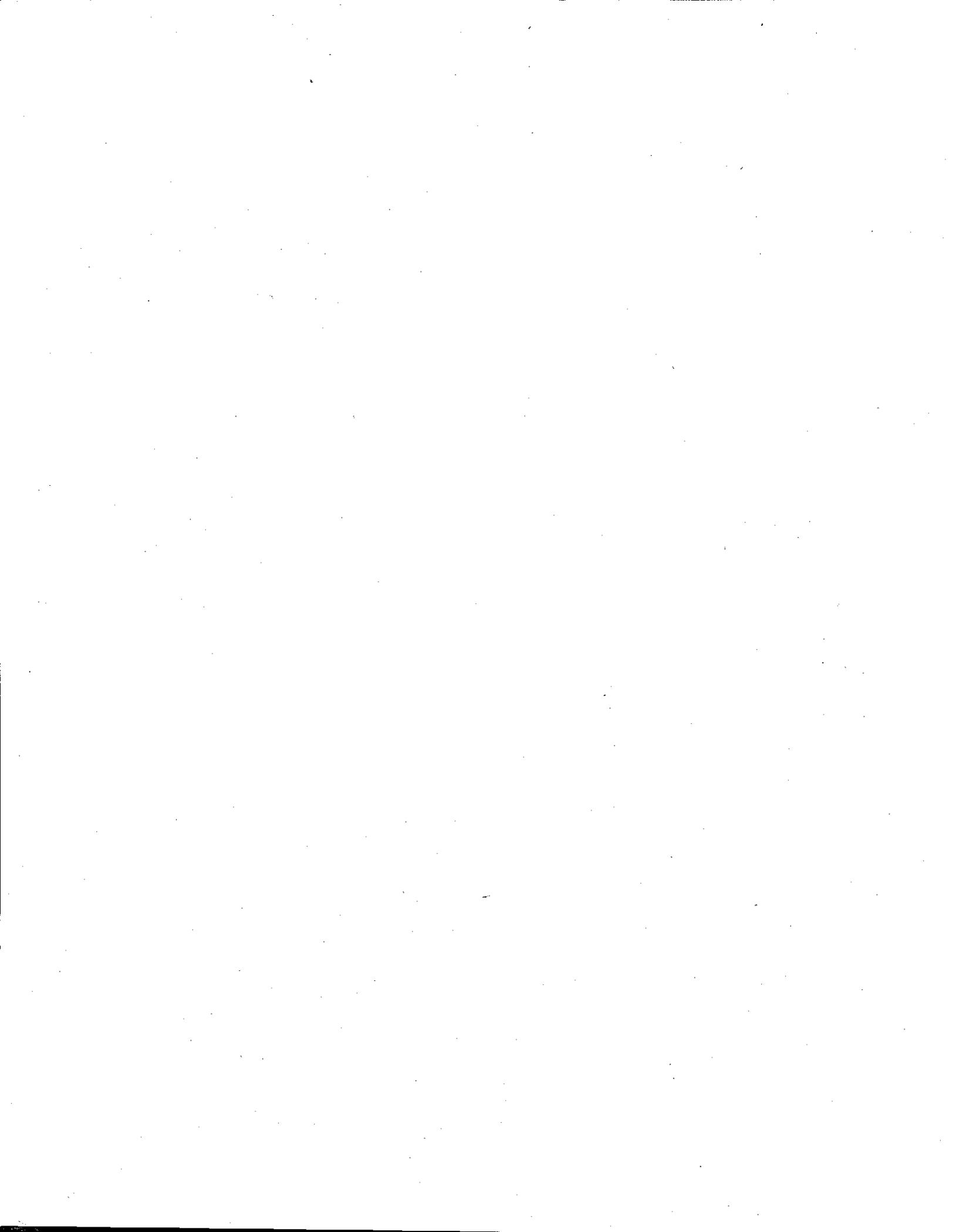


EXHIBIT 10





County of Imperial

Building Roads into the Next Century

PUBLIC WORKS DEPARTMENT

RECEIVED

September 24, 2008

SEP 24 2008

IMPERIAL COUNTY
PLANNING & DEVELOPMENT SERVICES

Mr. Jurg Heuberger, Director
Planning & Development Services Department
801 Main Street
El Centro, CA 92243

Attention: David Black, Planner IV

SUBJECT: Conditional Use Permit #08-0023; ORNI 19 L.L.C./Ormat Nevada Inc.
APN 037-090-006-000; 037-100-007, 006, 005, 004, 003, 002, 001; 037-
110-004, 005, 007, 0099, 015, 016-000; 037-120-030, 031-000; 037-140-
002, 006, 009, 013, 014, 015-000; 037-150-015, 016, 019-000; 037-16-
0027-000 & 037-180-009, 011-000; Rutherford Road, Best Road, Ward
Road, Wills Road, Groshen Road

Dear Mr. Heuberger:

This letter is in response to your letter and copy of Conditional Use Permit package received on September 4, 2008 for the above-mentioned project. The project proposes to build the East Brawley Geothermal Development Project in the vicinity of the Brawley 2 Geothermal Exploration Project covered under Conditional Use Permit #07-00029 and the Environmental Impact Report (EIR) for the Geothermal Overlay Zone (g-zone).

This Conditional Use Permit application is for the construction of a new 49.9 net megawatt (MW) binary power plant composed of (6) Ormat Energy converters (OEC), an expanded geothermal well field beyond the six exploration wells, pipelines to injection wells, pipelines to distribute Noncondensable gases from production wells to power plant area and injection wells, an electric transmission line to interconnect to the substation at the North Brawley 1 Geothermal Power plant, and a water pipeline to bring water from an Imperial Irrigation District (IID) canal to the power plant for cooling water.

Department staff has reviewed the package information and the following comments shall be Conditions of Approval:

1. Best Road is classified as a Minor Arterial requiring one-hundred two (102) feet of right-of-way, being fifty-one (51) feet from existing road centerline. It is therefore requested that sufficient right-of-way be provided to meet this road classification. All

permit structures including above ground pipe should be located outside ultimate right of way.

2. Ward Road is classified as a Local County Road requiring sixty (60) feet of right-of-way, being thirty (30) feet from existing road centerline. It is therefore requested that sufficient right-of-way be provided to meet this road classification. All permit structures including above ground pipe should be located outside ultimate right of way.
3. Rutherford Road is classified as a Major Collector requiring eight-four (84) feet of right-of-way, being forty-two (42) feet from existing road centerline. However for planning purposes it should be considered as a Minor Arterial. It is therefore requested that all permanent structures, including above ground piping shall be located outside the ultimate Minor Arterial right-of-way.
4. Ward Road, Wills Road and Groshen Road are classified as Local County Roads requiring sixty (60) feet from existing road centerline. It is therefore requested that all permanent structures, including above ground piping shall be located outside the ultimate right-of-way.
5. The applicant shall furnish a Grading and Drainage Study/Plan to provide for property grading and drainage control, which shall also include prevention of sedimentation of damage to off-site properties. The Study/Plan shall be submitted to the Department of Public Works for review and approval. The applicant shall implement the approved plans. Employment of appropriate Storm Water Best Management Practices (BMP's) shall be included.
6. A traffic Study reviewing the short term construction and long term build out use of the project and suggested mitigations for all nearby road intersections as well as road segments and widths must be prepared and subject to review and approval by this Department.
7. As a minimum ½ road improvements along the entire project frontage along Best Road must be provided for.
8. An encroachment permit shall be secured from the Department of Public Works for any and all new, altered or unauthorized existing driveway(s) to access the properties.
9. A transportation permit shall be required for any heavy equipment and/or large vehicles which impose greater than legal loads on riding surface, including bridges.
10. Applicant shall contact Caltrans and City of Brawley for their concerns on this project.
11. Soils report shall be provided.

12. The project shall participate in the County's Subsidence Detection Program and County's Seismic Monitoring Program; these programs must reflect any anticipated changes resulting from this project.

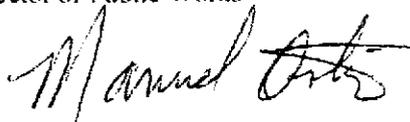
Please be advised that the County reserves the right to make additional comments as the project develops.

Should you have any questions, please do not hesitate to contact this office. Thank you for the opportunity to review and comment on this project.

Respectfully,

William S. Brunet, PE
Director of Public Works

By:

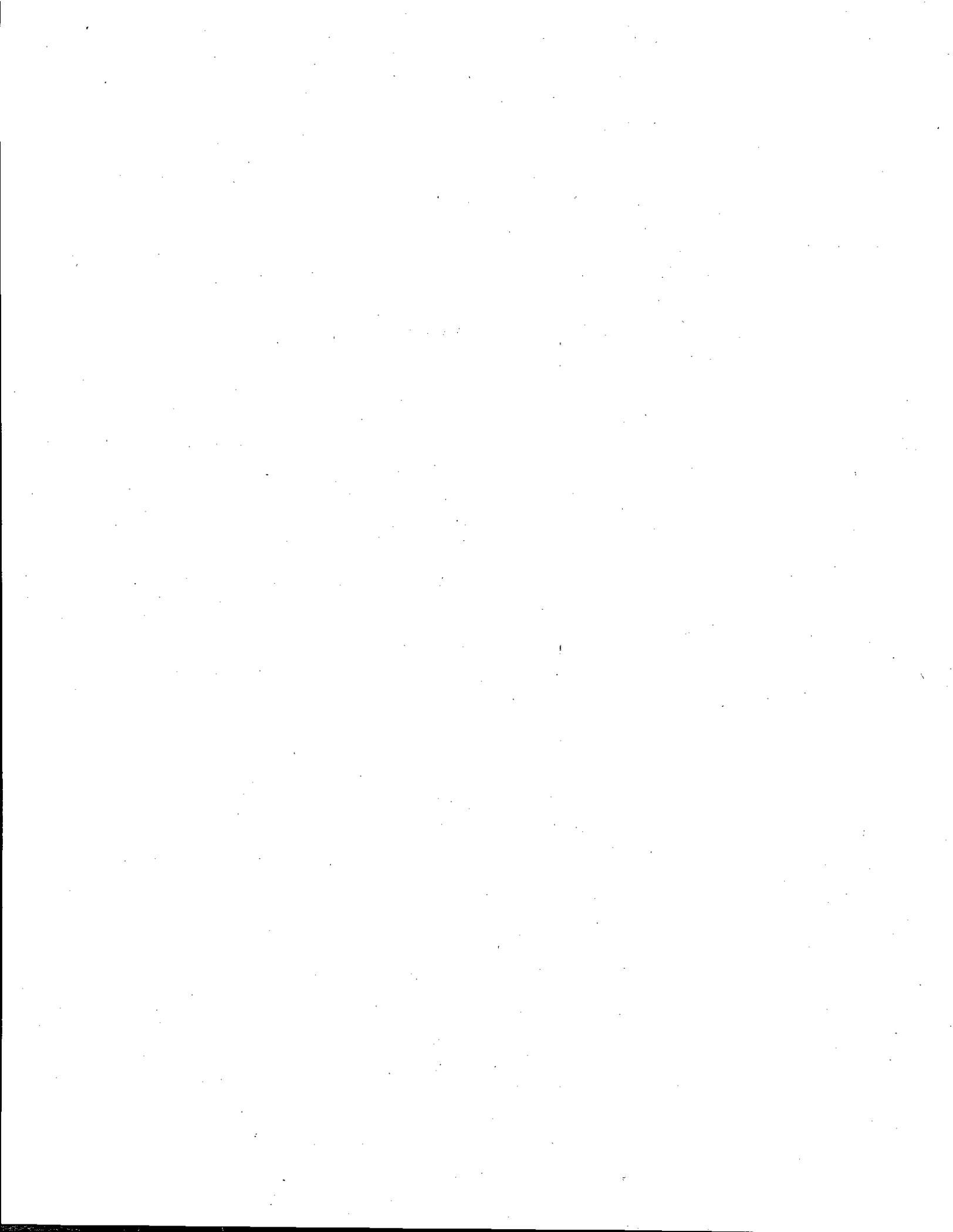


Manuel Ortiz
Assistant County Engineer

fp/ga



EXHIBIT 11





IMPERIAL IRRIGATION DISTRICT

OPERATING HEADQUARTERS • P. O. BOX 937 • IMPERIAL, CALIFORNIA 92251 •

October 22 2008

RECEIVED

OCT 23 2008

IMPERIAL COUNTY
PLANNING & DEVELOPMENT SERVICES

Mr. Jurg Heuberger, AICP
Director
Planning & Development Services
Imperial County
801 Main Street
El Centro, CA 92243

Subject: ORNI 19 LLC/Ormat Nevada Inc., Conditional Use Permit #08-0023 APN
037-090-006-000, 037-100-007, 006,005, 004, 003, 001, 037-100-004, 005,
007, 009, 015, 016-000, 037-120-030, 031-000, 037-140-002, 006, 009, 013,
014, 015-000, 037-150-015, 016, 019-000, 037-160-027-000, & 037-180-
009,011-000

Dear Mr. Heuberger:

Imperial Irrigation District (IID) Water Department reviewed the above Conditional Use Permit application. The proposed Project is located in Sections 10, 11, 14, 15, 16, 21, 22, and 23, T. 13 S., R. 14 E., SBM. This application is for the construction of a new 49.9 megawatt (MW) binary power plant composed of six Ormat Energy Converters, an expanded geothermal well field beyond the six exploration wells, pipelines to bring the geothermal brine to the power plant, pipelines to take the cooled brine to the injection wells, pipelines to distribute non-condensable gases from production wells to the power plant area and injection wells, an electric transmission line to interconnect to the substation at the North Brawley 1 Geothermal Power Plant, and a water pipeline to bring water from an IID canal to the power plant for cooling water. Below are the comments to this application:

1. This Project will impact several IID canals and drains. Project pipelines will cross and run parallel to canals and drains, encroaching on IID's rights-of-way.
2. All water delivered by the IID is subject to reasonable and beneficial use provisions as required by existing laws, regulations, ordinances and contracts. IID expects and will require new water users to implement Best Management Practices (BMPs), conservation measures, and new water saving technologies to reduce a project's water demand from IID.
3. All new industrial water users within the IID water service area are required to obtain a Water Supply Agreement in order to receive water deliveries. All water

Mr. Heuberger
October 22 2008
Page 2

users are subject to IID's *Rules and Regulations Governing the Use and Distribution of Water* and the Regulations for Equitable Distribution Plan adopted by the IID Board of Directors in their present form or as they may be amended hereafter. New non-agricultural water uses may be required to import water or provide replacement water to the IID for new water uses in excess of the project site's historical water use. Certain projects should also adhere to any City or County Water Supply Assessment or Water Supply Verification requirements as outlined in SB 610 or SB 221. These assessments or verifications are not a guarantee of service but will provide the environmental assessment necessary to execute the Water Supply Agreement with IID.

4. The applicant must obtain IID's Developer Project Guide 2008 (Developer Guide) which addresses general irrigation, drainage and discharge issues and mitigation of impacts to IID irrigation and drainage systems. This document details how a project is processed through the Water Department and includes the following: standard drawing for connection to IID drainage system, utility crossings standard details, an encroachment permit and other forms that may be applicable to this project. The Developer Guide may be obtained from:

Engineering Services Section
Imperial Irrigation District
333 E. Barioni Boulevard
Imperial, CA 92251
Tel: (760) 339-9256

5. The applicant should contact IID so that we may further discuss these various issues. The Energy Department should be contacted regarding power issues.

Thank you for the opportunity to review this application. If you have any questions regarding the above comments, please contact me at 339-9110.

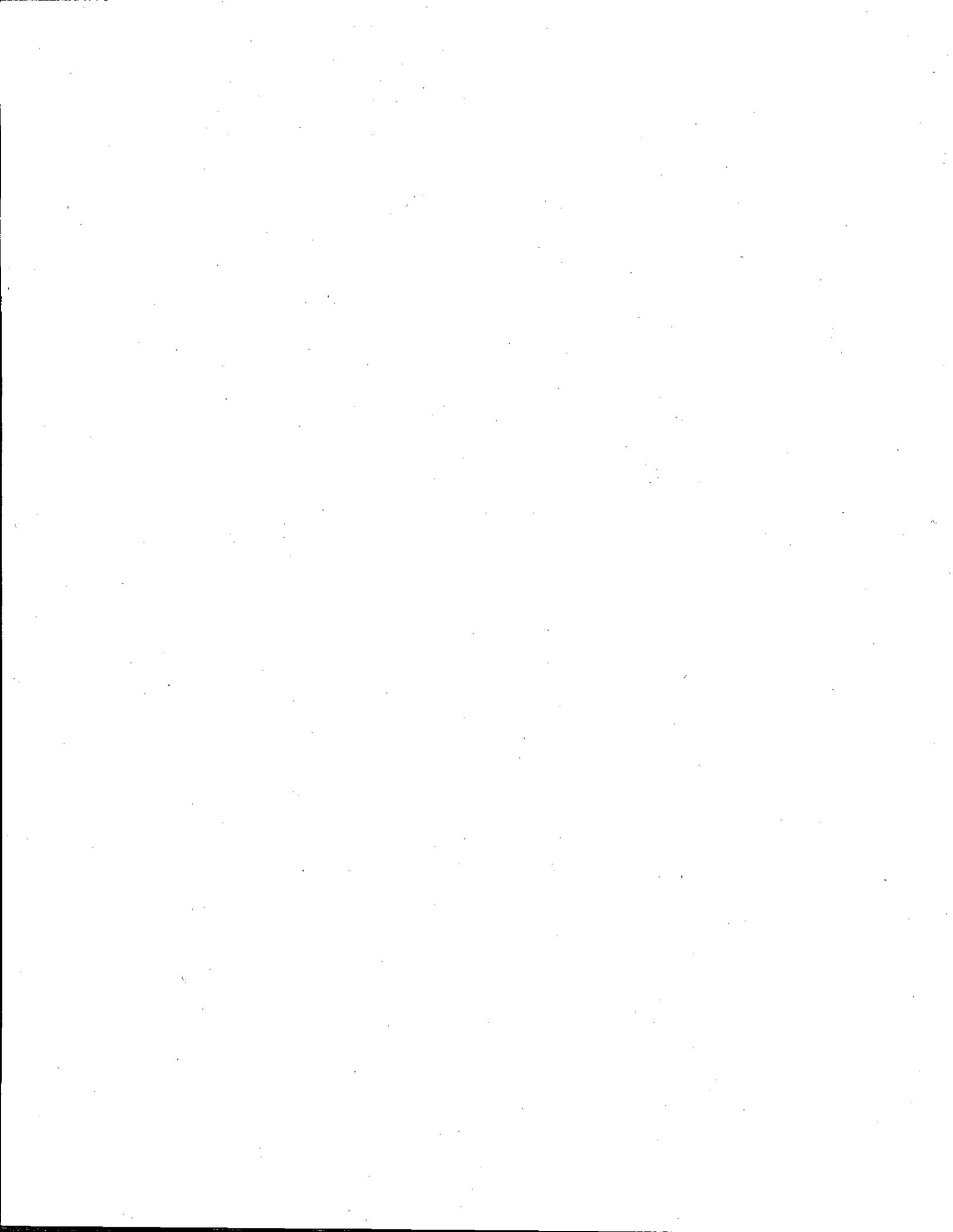
Sincerely,


FRED VALERA
Planner

FV:cr

cc: Project Management
Key Customer Coordinator

EXHIBIT 12





IMPERIAL COUNTY

PLANNING & DEVELOPMENT SERVICES

PLANNING / BUILDING INSPECTION / ECONOMIC DEVELOPMENT / PLANNING COMMISSION / A.L.U.C.

JURG HEUBERGER AICP, CEP, CBO
PLANNING & DEVELOPMENT SERVICES DIRECTOR

October 30, 2008

Charlene L. Wardlow
Director Project Development
Ormat Nevada Inc.
6225 Neil Road
Reno, NV 89511

RECEIVED

NOV 03 2008

ORMAT RENO OFFICE

RE: Conditional Use Permit #08-0023 (East Brawley Facility)
APN: 037-140-006-000

Charlene,

The Imperial County Planning & Development Services Department met with the Imperial Irrigation District (IID) today and discussed Ormat's proposed Geothermal Power Plant commonly referred to as the East Brawley Facility. In our discussion with the IID it was made clear that although IID staff has had one in contact with Ormat, said contact was preliminary and that no water availability contract has been drafted, nor is there one proposed in the near future. As you are well aware, availability of water is critical to the proposed Ormat East Brawley Facility and that absent a water contract with the IID this project is not feasible. That said, unless you have an alternative source of water we cannot proceed.

This Department finds that in order to proceed with the proposed Conditional Use Permit #08-0023 the availability of water will need to be resolved. Therefore, without the water issue resolved, in accordance with the Guidelines for California Environmental Quality Act, (California Code of Regulations, Title 14, Chapter 3, Section 15109) an "unreasonable delay" by the applicant has occurred, in the Department (Lead Agency for CEQA in Imperial County) is unable to complete the CEQA process. Therefore the Department hereby puts Conditional Use Permit #08-0023 on hold until such time that an executed water availability contract between the IID and Ormat is submitted to the Imperial County Planning & Development Services Department.

Additionally, all of the studies including the SB 610 Water supply Assessment previously requested by Department will need to be submitted prior to reactivation of the permitting process.

If you have any questions please contact me at (760) 482-4236 extension 4310 or e-mail me at Jurgheuberger@co.imperial.ca.us.

Sincerely,


Jurg Heuberger, AICP
Planning & Development
Services Director

CC: Darrell Gardner, Assistant Planning Director
CUP #08-0023

Files: 10.101, 10.102, 10.105

MSWJHJMS:APN FILES\037\140\006\CUP08-0023 project on hold lt 10 30 08 Finalized MS.doc

MAIN OFFICE: 801 MAIN ST., EL CENTRO, CA 92243
ECON. DEV. OFFICE: 836 MAIN ST., EL CENTRO, CA 92243

(760) 482-4236
(760) 482-4900

FAX: (760) 353-8938
FAX: (760) 337-8907

E-MAIL: planning@imperialcounty.net
(AN EQUAL OPPORTUNITY EMPLOYER)

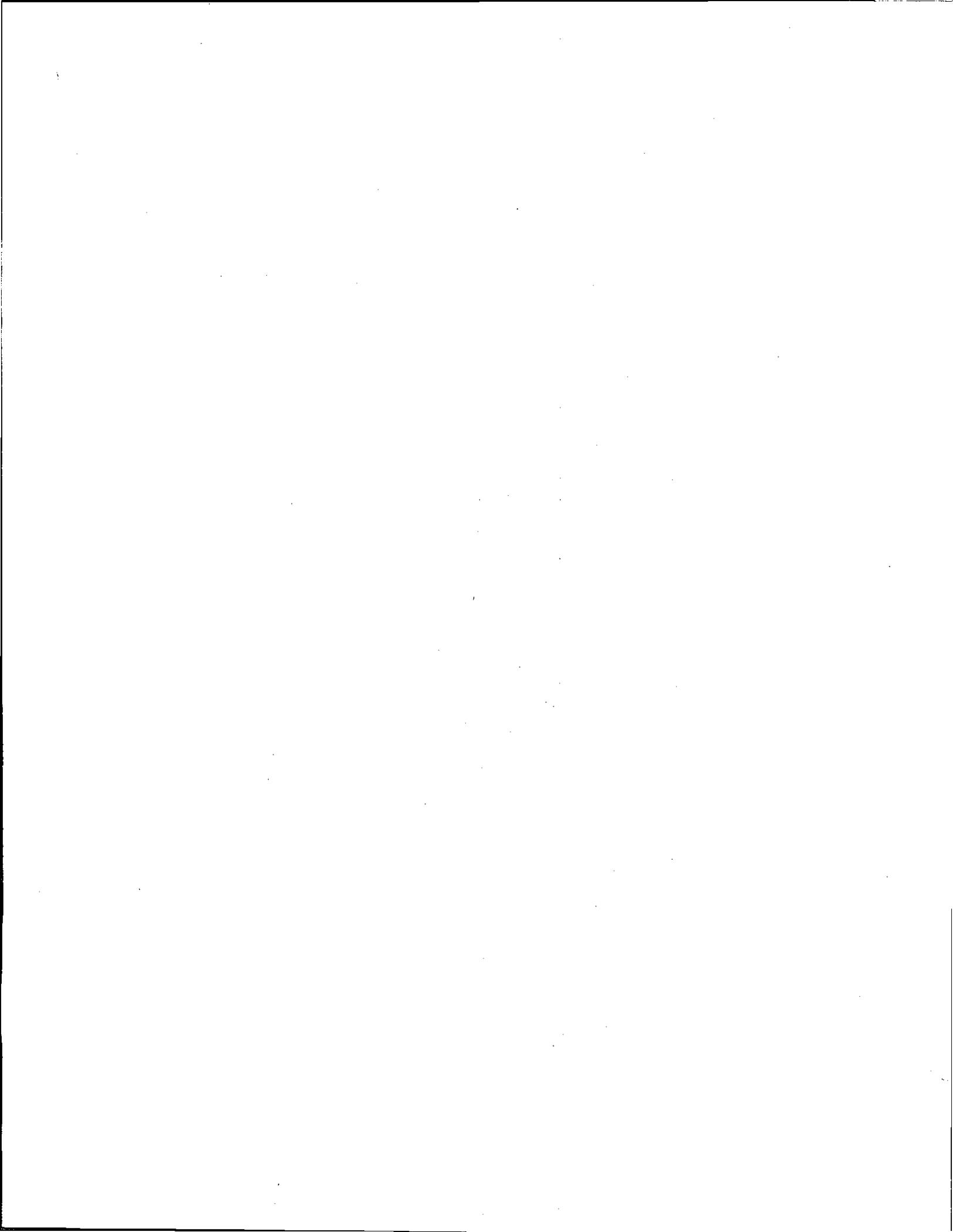
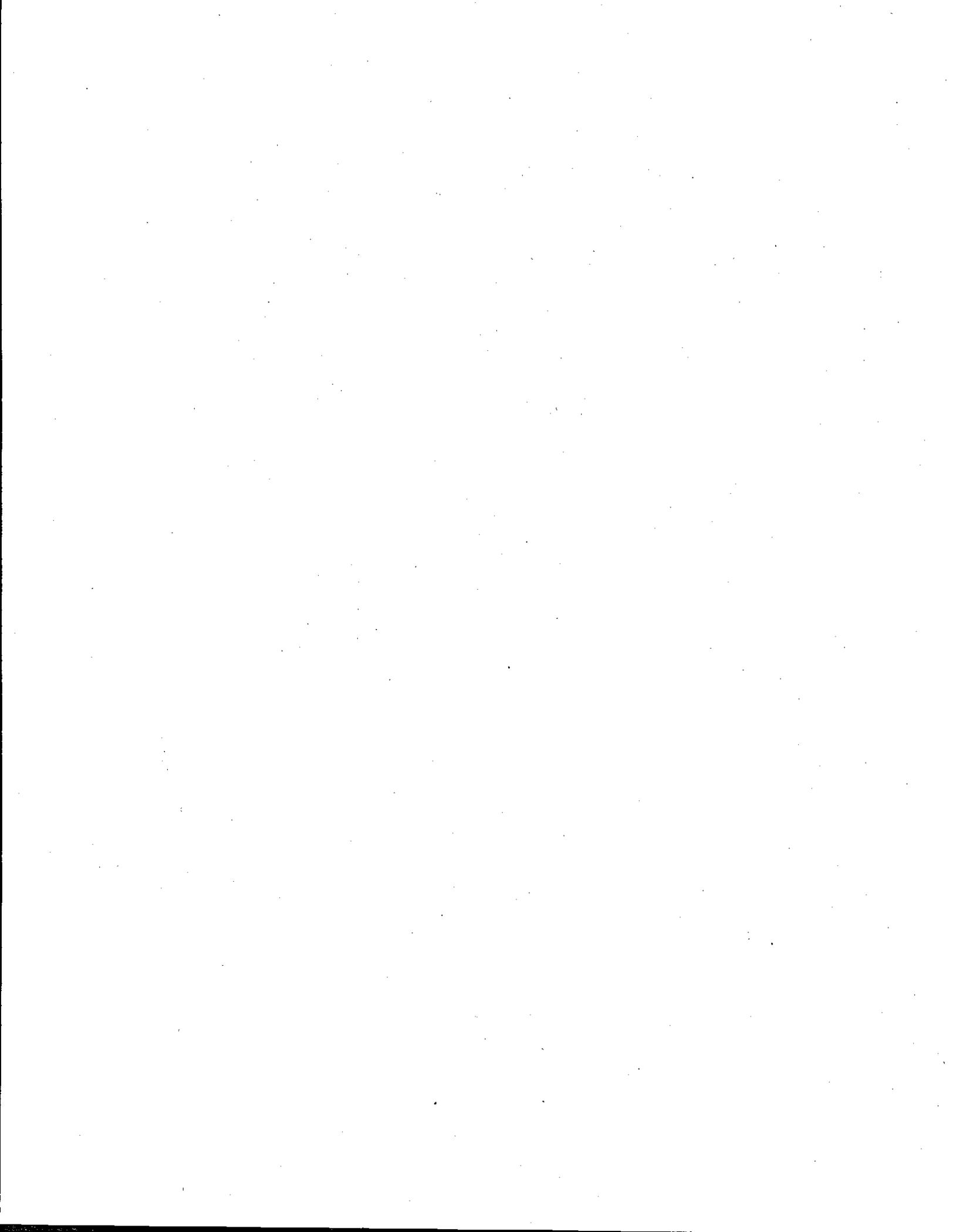


EXHIBIT 13



NOISE IMPACT ASSESSMENT

EAST BRAWLEY

GEOHERMAL DEVELOPMENT PROJECT

December 4, 2008

Submitted to:

County of Imperial
Planning & Development Services
801 Main Street
El Centro, CA 92243-2811

Submitted by:

Ormat Nevada Inc.
6225 Neil Road
Reno, NV 89511

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- 3 Projected Sound Levels at Nearest Residences During Operations

APPENDIX

Qualifications of Preparer

1.0 INTRODUCTION

1.1 Purpose of Report

ORNI 19, LLC, a wholly owned subsidiary of Ormat Nevada Inc. (Ormat), proposes to build the East Brawley Geothermal Development Project just north of the City of Brawley. The purpose of this report is to assess the potential noise impacts from this project.

1.2 Project Description

Overview: The East Brawley Geothermal Development Project would be built in the vicinity of the Brawley 2 Geothermal Exploration Project covered under Conditional Use Permit #07-0029. The project area is north of the City of Brawley in Imperial County, California. The proposed project is located east of the New River, approximately 1.75 miles east of the North Brawley 1 Geothermal Power Plant along Best Road. The project would be located on private agriculture lands just north of the City of Brawley in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, San Bernardino Base and Meridian (SBM). The project is in the Geothermal Overlay Zone (g-zone) that was covered by the Final Environmental Impact Report (EIR) dated April 1979 and approved by the Board of Supervisors. It analyzed up to 800 megawatts in the g-zone.

Project Location: The East Brawley Geothermal Power Plant would be located on private agriculture lands in the southeast corner of Section 15, Township 13 South, Range 14 East, SBB&M identified by Assessor's Parcel Number 037-140-06-01. The total property size is 32.81 acres and will not be subdivided. The power plant area will be enclosed by a 6 foot wire fence in an area approximately 900 by 600 feet not including the substation or Stormwater retention basin. The house that is currently on the property will be vacated prior to the delivery of isopentane. The main entrance to the power plant will be on Best Road just north of Ward Road from a left hand turn pocket built for this project. It will be necessary to cover Best Canal along the property frontage to accommodate widening of the road for the turn pocket. The emergency access will be from Best Road into the south end of the property on the north side of the Livesley Drain. The emergency access road will be constructed with an all-weather surface and lead to a locked gate that can be opened by any emergency responders. Both of the entrances into the plant site provide excellent access from the new Highway 111 bypass that will include an exit onto Best Road just south of Shank Road. Traffic will come from Interstate 8, north on Highway 111 to Best Road.

Land Use Setting: The southern boundary of the project area is just north of the City of Brawley's boundary within their "sphere of influence" and just north of the in-construction Highway 111 bypass in an area zoned M-1 Light Manufacturing. The southwestern boundary of the project is the Del Rio Country Club bounded by the New River. The land to the north and east is agriculture. The eastern boundary of the project is Dietrich Road and to the north Rutherford Road. The majority of the project is along Best Road from Shank to Rutherford Roads. An at-grade intersection will be built at the Highway 111 bypass and Best Road which will provide the best access to the plant site and well field. Well pads may be accessed from the other county roads in the area: Dietrich, Groshen, Rutherford, Ward and Wills. There are also farm and IID canal roads that will be used to access some well locations.

Project Facilities: The East Brawley Geothermal Development Project would include the following facilities:

- A 49.9 net MW geothermal power plant consisting of up to six (6) OEC binary generating units (12.5 MW gross each) with vaporizers, turbines, generators, condensers, preheaters, pumps and

- piping, motive fluid (isopentane) storage, a motive fluid vapor recovery system (VRU), a gas scrubber, and possibly a regenerative thermal oxidizer (RTO) and related ancillary equipment;
- Two (2) cooling tower batteries with a total of 14-20 cell counter flow, induced draft with drift eliminators of 0.0005 efficiency;
 - A control room, office, maintenance shop, parking, and other facilities located at the power plant site;
 - Approximately 60 total wells, approximately half for production and half for injection. The final number of wells will be determined by drilling results. Each well will average 4500 feet in depth. Production wells will have a gas separator and corrosion and scale inhibitor and a geothermal fluid booster pump to pump the fluid to the power plant. The production wells will also have a sand separator;
 - Piping from production wells to the power plant and from the power plant to the individual injection wells. Gas pipelines will take the gas contained in the brine from the gas separators to either the injection wells or to the gas scrubber at the power plant;
 - Blowdown wells (2-4) at the power plant site to provide for injection of the cooling tower blowdown;
 - Pumps, tank, valves, controls, flow monitoring and other necessary equipment to the wells and pipelines;
 - Piping, canals or ditches and pumps to bring water from IID's Rockwood Canal to the power plant; and
 - A substation with a 2 mile long double circuit 13.8 and 92 kilovolt (kV) transmission line with 66 foot high poles to interconnect to the IID at the North Brawley 1 substation at Hovley and Andre Roads. It will span the New River.
 - Communication Tower on the plant site to facilitate communications for a central control room, location yet to be determined, for all Imperial Valley operations.

Construction: Ormat would like to start construction on the project during the first quarter of 2009. Construction of the power plant would require approximately 15 months. Construction would require up to 200 workers at peak construction.

1.3 Noise Terminology and Fundamentals

Noise is customarily measured in decibels (dB), units related to the apparent loudness of sound. A-weighted decibels (dBA) represent sound frequencies that are normally heard by the human ear. On this scale, the normal range of human hearing extends from about 3 dBA to 140 dBA. Speech normally occurs between 60 and 65 dBA. Table 1 shows the noise levels of different activities and the response criteria of various noise levels.

A logarithmic decibel scale is used to measure sound, because hearing sensation increases with the logarithm of the stimulus intensity. Each 10-dBA increase in the level of a continuous noise is a ten-fold increase in sound energy, but is judged by a listener as only a doubling of loudness. For example, 60 dBA is judged to be about twice as loud as 50 dBA and four times as loud as 40 dBA. Each 3 dBA increase in sound is a doubling of sound energy, such as doubling the amount of traffic on a street, but is judged as only about a 20 percent increase in loudness, and is a just-noticeable difference to most people. Increases in average noise of about 5 dBA or are more noticeable to most people, and is the level required before any noticeable change in community response would be expected. A 10 dBA change would almost certainly cause an adverse change in community response (EPA, 1981).

Table 1
Weighted Sound Levels and Human Response

<u>Sound Source</u>	<u>dB(A)¹</u>	<u>Response Criteria</u>
Carrier Deck Jet Operation	140	Painfully Loud Limit Amplified Speech
Jet Takeoff (200 feet)	130	
Discotheque	120	Maximum Vocal Effort
Auto Horn (3 feet)		
Riveting Machine	110	Very Annoying Hearing Damage (8 hours)
Jet Takeoff (2,000 feet)		
Shout (0.5 feet)	100	Annoying
New York Subway Station		
Heavy Truck (50 feet)	90	Telephone Use Difficult Intrusive
Pneumatic Drill (50 feet)		
Freight Train (50 feet)	80	Quiet
Freeway Traffic (50 feet)	70	
Air Conditioning Unit (20 feet)	60	Very Quiet
Light Auto Traffic (50 feet)		
Living Room	50	Just Audible
Bedroom	40	
Library		Threshold of Hearing
Soft Whisper (15 feet)	30	
Broadcasting Studio	20	
	10	
	0	

¹ Weighted sound levels taken with a sound-level meter and expressed as decibels on the scale.

Source: U.S. EPA, 1981.

Because environmental noise levels fluctuate over time, a time-averaged noise level in dBA is often used to characterize the acoustic environment at a given location. The average noise intensity over a given time is the energy equivalent noise level (Leq). The day-night equivalent noise level (Ldn) is a 24-hour Leq which is derived by adding a 10 dBA "penalty" to noise levels measured between 10 p.m. and 7 a.m. The community noise equivalent level (CNEL) incorporates an additional 5 dBA penalty to sound levels measured between 7 p.m. and 10 p.m. These "penalties" account for the greater sensitivity of people to high noise levels at night. The more conservative CNEL noise calculation method is the method chosen for this analysis.

1.4 Noise Guidelines and Standards

Federal, state, and local agencies have developed noise guidelines and standards. The standards most applicable to the proposed project are the Imperial County General Plan Noise Element (*County of Imperial, 1997*) and the Imperial County Noise Abatement and Control Ordinance (*County of Imperial,*

2008). The Noise Element contains standards for construction and operations noise. Noise guidelines for assessing the significance of noise impacts from new projects are provided in Section 3.0.

3.0 EXISTING AND BACKGROUND NOISE CONDITIONS

3.1 North Brawley Geothermal Overlay Zone

The proposed East Brawley generating facilities and well field will be located entirely within the North Brawley Geothermal Overlay Zone, approximately 13,640 acres of mostly agricultural land that has been designated by the Imperial County Planning Department as suitable for geothermal development. The 1979 Master Environmental Impact Report (EIR) described the existing environment and evaluated the impacts of an 800-Megawatt (MW) Geothermal Development at North Brawley. The Master EIR considered 8 - 12 geothermal plants, along with 320 to 400 total production and injection wells, and related pipelines and other associated facilities, located north of the City of Brawley. The Master EIR and the related Final EIR for the North Brawley Geothermal Demonstration Project, prepared for Southern California Edison (SCE), were used as the basis for approval of the 10 MW Brawley Geothermal Project. The SCE project was decommissioned in the late 1980's.

The existing environmental conditions in the North Brawley Geothermal Overlay Zone are similar to the conditions described in the 1979 Master EIR. Agriculture remains the dominant land use. The most substantial differences between current conditions and those considered in the Master EIR are the absence of the additional geothermal projects planned in 1979 and the expansion of the City of Brawley to the north (though the City is still outside of the overlay zone).

3.2 Sensitive Receptors in the Project Area

Occupants in such land uses as schools, hospitals, housing, religious, educational, convalescent, and medical facilities are more sensitive to noise than commercial, agricultural, and industrial uses. As defined in the Imperial County General Plan Noise Element, sensitive noise receptors are, in general, areas of habitation where the intrusion of noise has the potential to adversely impact the occupancy, use or enjoyment of the environment. Sensitive receptors include, but are not limited to, residences, schools, hospitals, parks and office buildings. Sensitive receptors may also be non-human species, including some riparian bird species.

There project area is a rural, agricultural area with scattered houses. The residences immediately south and east of the power plant site will be relocated prior to the start-up of the power plant. The nearest remaining residences to the proposed plant site and wells are identified below:

Project Location	Distance to Nearest Residences
Wellsites (Nearest wells to residences below):	
Well #45-22	Approximately 0.1 miles west
Well #83-15	Approximately 0.2 miles west
Well #87-10	Approximately 0.15 miles west
Geothermal Plant:	
East Brawley Power Plant Site	Approximately 0.25 miles south
East Brawley Power Plant Site	Approximately 0.4 miles northeast
East Brawley Power Plant Site	Approximately 0.9 miles northeast

3.3 Existing Noise in the Project Area

Primary sources of noise in the project area include aircraft overflight, agricultural equipment, and vehicle traffic (*County of Imperial, 1997*). The predominant land use in the area is agriculture. Noise sources associated with agricultural operations include the field machinery, especially diesel engine driven heavy trucks, used for the delivery of supplies and the distribution of products; and aircraft, used for the spraying of crops (*County of Imperial, 1997*). Typical electric pump noise emissions from agricultural operations range from 69 – 77 dBA at 50 feet.

Baseline noise surveys conducted in the North Brawley KGRA for the Master EIR recorded baseline noise levels of 53 to 62 dBA (*VTN Consolidated, Inc. 1978*). These levels are within the range of noise levels that were measured in representative areas for the SR 78/111 Brawley Bypass, which showed that existing noise levels ranged from hourly Leq's of 48dBA to 68 dBA (*Caltrans, 2001*). These levels are consistent with typical rural area noise levels in areas with only intermittent noises from traffic and agricultural equipment operating in the area. As most of the nearby residences are located adjacent to roadways, background noise levels are expected to be in the higher end of the range, around 60 dBA.

4.0 IMPACT ANALYSIS AND MITIGATION MEASURES

4.1 Significance Criteria

Appendix F of the California Environmental Quality Act (CEQA) Guidelines indicate that a project will normally result in a significant adverse impact if it causes "a substantial increase in the ambient noise level in areas sensitive to noise adjacent to the project site." To help assess what a "substantial increase" in ambient noise is, the criteria listed below were developed. Noise impacts from the proposed project are considered significant if one of these criteria is met:

Construction Noise Standards

- Per the Noise Element of the Imperial County General Plan, impacts from construction are defined as construction noise from a single piece of construction equipment or a combination of equipment that exceeds 75 dBA Leq when averaged over an 8-hour period and measured at the nearest sensitive receptor (e.g., residences, schools, hospitals, parks, office buildings, and certain non-human species, including riparian bird species). In cases of extended length construction times, the standard may be tightened so as not to exceed 75 dB Leq when averaged over a one hour period.
- The Noise Element also states that construction equipment operation be limited to the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. Saturday. However, as explained in Section 4.3, Ormat performs construction during night-time hours to avoid heat illnesses of construction workers. Even though construction occurs during night-time hours, impacts will still be less than significant as described later. The geothermal section of the Land Use Code (Section 91702.01(S)) also allows drilling on a twenty-four (24) hour basis provided the other standards of the geothermal code are met.

Operation Noise

- Noise/Land Use Compatibility Standard: The Noise Element contains guidelines for the compatibility among various land uses. The land use zoning in the project area is General Agricultural/Geothermal. The noise/land use compatibility guidelines for agricultural land use specified in the Noise Element of the Imperial County General Plan indicate that specified land uses are normally acceptable when the CNEL is less than 70 dB. New construction or development is conditionally acceptable when the CNEL ranges from 70 to 75 dB. It is normally unacceptable when the CNEL ranges from 75 to 80 dB, and clearly unacceptable when the CNEL is over 80 dB. Noise levels of up to 60 dBA (CNEL) are normally acceptable for residential development and noise levels of up to 70 dBA (Ldn or CNEL) are conditionally acceptable. If noise levels due to the proposed project exceed these levels above, impacts may be considered significant.
- Increase of Ambient Noise Levels: According to the Noise Element, if future noise levels from a project are within the "normally acceptable" noise level guideline, but result in an increase of 5 dB CNEL or greater, the project would have a potentially significant impact and mitigation measures must be considered. If the future noise level after the project is completed is greater than the "normally acceptable" noise level, a noise increase of 3 dB CNEL or greater should be considered a potentially significant noise impact, and mitigation measures must be considered.

- **Property Line Noise Limits:** The Imperial County General Plan Noise Element includes Property Line Noise Limits that apply to noise generation from one property to an adjacent property. The standards imply the existence of a sensitive receptor on the adjacent, or receiving, property. If a noise-sensitive receptor is not present on the adjacent property, an exception to the standards may be appropriate. Depending on the time of day, the applicable 1-hour average sound level may not exceed 45 to 55 dB in residential zones or 75 dB in general industrial zones (including agricultural operations). The Imperial County Noise Abatement and Control Ordinance also includes property line noise limits that are consistent with these in the Noise Element, further defining that the residential zones are specifically R-1, etc. Because the zoning in the project area is A-2-G, the general industrial/agricultural noise limits (75 dBA) will apply to this project.
- **Noise generating sources in Imperial County** are regulated under the County of Imperial Codified Ordinances, Title 9, Division 7 (Noise Abatement and Control). Noise limits are established in Chapter 2 of this ordinance. Under Imperial County Code Section 90702.00 Subsection A, average hourly noise in residential areas is limited to 50 to 55 dBA from 7 a.m. to 10 p.m., and to 45 to 50 dBA from 10 p.m. to 7 a.m. The most stringent limitation effectively prohibits sources that cause more than 53 dBA CNEL on a day-night basis.

If any of the above criteria are exceeded, then mitigation measures will be recommended to avoid or reduce the impact.

4.2 Noise Mitigation Measures Incorporated into Project

Although the assessment of impacts assumes the implementation of those measures incorporated into the project design or required by regulation which avoid or reduce potentially significant impacts, these measures are expressly identified below to facilitate review and implementation. Mitigation measures, if any, which are proposed to avoid or reduce potentially significant effects are separately identified

The applicant-proposed measures were identified in the CUP application and environmental analysis along with additional measures from the Imperial County Land Use Code specific to geothermal projects (Division 17). The impact analysis in the following sections assumes that all these measures will be implemented. Additional mitigation measures are recommended if it is determined that the measures below do not fully mitigate the impacts for which they are presented.

Ormat will comply with County-specified noise control measures, including:

1. The drilling operator shall limit drilling noise to a sound level equivalent to CNEL sixty (60) dB(A) as measured at the nearest human receptor outside the parcel boundary. This level may be exceeded by ten percent (10%) if the noise is intermittent and during daylight hours. (Land Use Code 91702.01(B))
2. Diesel equipment used for drilling within three hundred (300) feet of any residence shall have hospital-type mufflers. Well venting and testing at these wells shall be accompanied by the use of an effective muffling device or silencer. (Land Use Code 91702.01(D))
3. Heavy truck traffic, well site preparation, pipe stacking and hydroblasting (used for descaling operations) shall be limited to the hours between 7:00 AM and 7:00 PM for any wells within three hundred (300) feet of any residence. Exceptions may be made where sound proofing is

provided, or during summer hours to minimize effects of heat with notice to the planning director and approval thereof. (Land Use Code 91702.01(I and M))

4. Impulse noises such as sudden steam venting shall be controlled by discharge through a muffler or other sound attenuating system, as appropriate. (Land Use Code 91702.01(O))
5. Drilling may be on a twenty-four (24) hour basis provided the standards above are met. ((Land Use Code 91702.01(S)).
6. As a best management practice, minimize unnecessary construction vehicle use and idling time. The ability to limit construction vehicle idling time is dependent upon the sequence of construction activities and when and where vehicles are needed or staged. A "common sense" approach to vehicle use shall be applied; if a vehicle is not required for use immediately or continuously for construction activities, its engine shall be shut off. (Note: certain equipment, such as large diesel-powered vehicles, require extended idling for warm-up and repetitive construction tasks).

4.3 Evaluation of Noise from Construction Activities

Construction of the proposed power plant would involve the short-term use of heavy equipment such as backhoes, cranes, loaders, dozers, graders, excavators, compressors, generators, and various trucks for mobilizing crew, transporting construction material and debris, line work, and site watering. Construction of the wells would require use of drill rigs and large augers at each well location. The principal noise sources during construction would be the diesel engines on the construction equipment and drilling rig and the movement of pipe and casing. This would be temporary and only occur during the actual construction and drilling operations.

Construction noise is usually made up of intermittent peaks and continuous lower levels of noise from equipment cycling through use. Noise levels associated with individual pieces of equipment can generally range between 70 and 90 dBA (*U.S. DOT, 2006*). Based on previous analyses, the maximum instantaneous construction noise level for this analysis is 83 dBA at a distance of 50 feet from any work site (for both site construction and well drilling activities) (83 dBA reference from *Crocker and Kessler 1982* and *Environmental Science Associates 2002*).

The nearest human noise receptors would be the residents at the two homes in the Project area. See Table 2 for identification of the nearest receptors to the plant and well construction sites. As discussed in Section 4.1, Imperial County limits sound levels from construction activities to 75 dBA when averaged over an eight-hour period and measured at the nearest sensitive receptor. As shown on Table 2, construction noise levels at the sensitive receptors closest to the wells can reach as high as 59 to 63 dBA, far below the 75 dBA limit. Additionally, these estimated maximum construction noise levels would be infrequent and the total construction period for the well sites would be 20 days.

Additionally, all calculated noise levels fall within the "normally acceptable" range of the guidance set forth in the Noise Element to the Imperial County General Plan. Because the maximum noise exposure falls within the "conditionally acceptable" range and would be temporary and short-term, the noise levels generated by the Project would not result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Table 2: Projected Sound Levels at Nearest Residences During Construction

Project Location	Distance to Nearest Residences	Projected Sound Level from the Project at the Nearest Residence (excludes background noise)
Construction of Power Plant	Approximately 0.25 miles south	55 dBA
Construction of Wells (Nearest wells to residences below):		
Well #45-22	Approximately 0.1 miles west	63 dBA (during 20-day construction only)
Well #83-15	Approximately 0.2 miles west	57 dBA (during 20-day construction only)
Well #87-10	Approximately 0.15 miles west	59 dBA (during 20-day construction only)

As described in the CUP application and in Section 4.1 above, Ormat would comply with the applicable noise control measures required by the County Noise Element and Noise Ordinance. Some plant construction activities will take place on a 24 hour basis, seven days per week, including night-time work especially during the summer to avoid work during the heat of the day, but due to the distance to the nearest receptors and the resulting noise levels, the noise impacts will be less than the applicable significance criteria. The geothermal section of the Land Use Code (Section 91702.01(S)) also allows drilling on a twenty-four (24) hour basis provided the other standards of the geothermal code are met.

4.4 Evaluation of Noise from Long-Term Operations

Normal binary power plant operations are less noisy than construction and drilling activities. The principal noise sources would be turbine operations, noise generated from cooling tower, and associated project vehicles. Typically the loudest component of the power plant operations is the noise from the cooling towers. Noise from two cooling towers used in geothermal operations has been measured at 81-84 dBA at 10 feet (*Kestin, 1980*). Cooling tower noise would typically attenuate to less than 42 dBA at one-quarter mile, or less than the existing background noise in the area. Using the simple and usually conservative assumption of hemispherical attenuation of sound with distance, a reduction of 6 dBA per doubling of the distance is calculated.

Table 3 provides an estimate of the projected noise level from the proposed power plant site at the nearest residences. As shown on this table, the three nearest residences to the proposed plant site range from ¼ to almost one mile away. Sound levels from ongoing operations from the Project at these nearest residences are projected to range from 30 to 42 dBA. These levels are also about 10 to 20 dBA less than the background noise levels noted above, meaning that geothermal plant operation would not be audible at the nearest residences and indistinguishable from existing ambient noise levels. These noise levels are all below the significance criteria listed in Section 4.1, meaning that the noise impact from the proposed geothermal plant operation would be less than significant.

Table 3: Projected Sound Levels at Nearest Residences from Plant Construction

Distance to Nearest Residences	Projected Sound Level from the Project at the Nearest Residence (excludes background noise)
Approximately 0.25 miles south	42 dBA
Approximately 0.4 miles northeast	38 dBA
Approximately 0.9 miles northeast	30 dBA

Truck, service vehicle and worker vehicle traffic during Project operations would be small at less than 84 trips per day. The impact from traffic noise from these small numbers of vehicles would be less than significant.

4.5 Additional Mitigation Measures

The analysis above shows that there will be no significant impacts during both construction and long-term operation of the proposed project; therefore, no additional mitigation measures are required.

5.0 REFERENCES

- Caltrans, 2001. *State Route 78/111 Brawley Bypass, Draft Environmental Impact Report*.
- Crocker, M.J. and F.M. Kessler. 1982. *Noise and Noise Control, Volume II*. CRC Press, Inc. Boca Raton, FL. 300 pp. (ISBN 0-8493-5094-8).
- Imperial County, 1997. *Noise Element to the County of Imperial General Plan*.
- Imperial County, 2008. *County of Imperial Codified Ordinances*, current through Ordinance 1438, passed July 29, 2008.
- Kestin, J. DiPippo, R., Khalifa, H.E., and Ryley, J. (editors), 1980. *Sourcebook on the Production of Electricity from Geothermal Energy*. U.S. Department of Energy, Washington D.C. 997 pp.
- ORNI 17, LLC/Ormat Nevada Inc. 2008. *Brawley 2 Geothermal Exploration Project, Conditional Use Permit #07-0029* issued by Imperial County Planning & Development Services March 2008.
- ORNI 17, LLC/Ormat Nevada Inc. 2008. *Brawley 2 Geothermal Exploraion Project Negative Declaration*, March 2008.
- ORNI 19, LLC/Ormat Nevada Inc., *East Brawley Geothermal Development Project, Conditional Use Permit Application*.
- ORNI 19, LLC/Ormat Nevada Inc., *East Brawley Geothermal Development Project, Conditional Use Permit Application – Environmental Assessment*.
- U.S. Environmental Protection Agency, 1981. *Noise Effects Handbook*. Office of Noise Abatement and Control, Fort Walton, FL. EPA 550-9-82-106.
- U.S. DOT (Department of Transportation, Federal Transit Administration), 2006. *Transit Noise and Vibration Impact Assessment*. FTA-VA-90-1003-06. May.
- VTN Consolidated, Inc. 1978. *Master EIR for the North Brawley KGRA*.

APPENDIX

QUALIFICATIONS OF PREPARER

Noise Analysis Prepared by:
Ron Leiken, QEP, REA, CEM

EDUCATION

1987 B.S., magna cum laude, Natural Resources Management, California Polytechnic State University, CA.

EXPERIENCE

Mr. Leiken has 23 years of environmental experience, summarized below.

NEPA and CEQA Experience: Mr. Leiken has extensive experience with and understanding of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). He has managed completed documents and prepared almost all technical sections. His expertise has been with preparing air quality, noise, and odor sections of these documents. He has analyzed noise and air quality impacts from industrial projects (power plants, vehicle manufacturing), transportation projects (new highways and roads, roadway widening projects, bus stations), new residential developments, new commercial and industrial development, recreation (ski resorts, boating, and campgrounds), ships, rail, and helicopters.

Noise Experience: Mr. Leiken's noise experience includes an extensive amount of noise monitoring and modeling, noise and air impact analysis, transportation noise modeling, background noise monitoring, noise predictions, impact assessment, compliance monitoring, and noise mitigation plans. He has experience with both stationary, industrial noise sources and with traffic noise. He is experienced with Caltrans' *Traffic Noise Analysis Protocol* and *Technical Noise Supplement*, experienced with FHWA's *STAMINA/OPTIMA* highway noise models and with the new *Transportation Noise Model (TNM)*, experienced with Caltran's *Sound 32* and *Sound 2000*, the Caltrans versions of the FHWA highway noise prediction programs. He is also experienced with noise monitoring, using Type 1 sound level meters to measure noise and various statistical measures of noise (i.e., Lav, L90, L50). He also performs noise compliance monitoring, to determine if noise levels from certain activities exceed county or city noise limits, as well as OSHA occupational exposure compliance monitoring.

SAMPLE PROJECTS - NOISE IMPACT AND MITIGATION ASSESSMENT PROJECTS

Mr. Leiken has prepared many noise impact analyses and/or evaluation of mitigation measures. Many of these were for CEQA Environmental Impact Reports and NEPA Environmental Impact Statements, and many were stand-alone technical noise documents. A sampling of these projects includes the following:

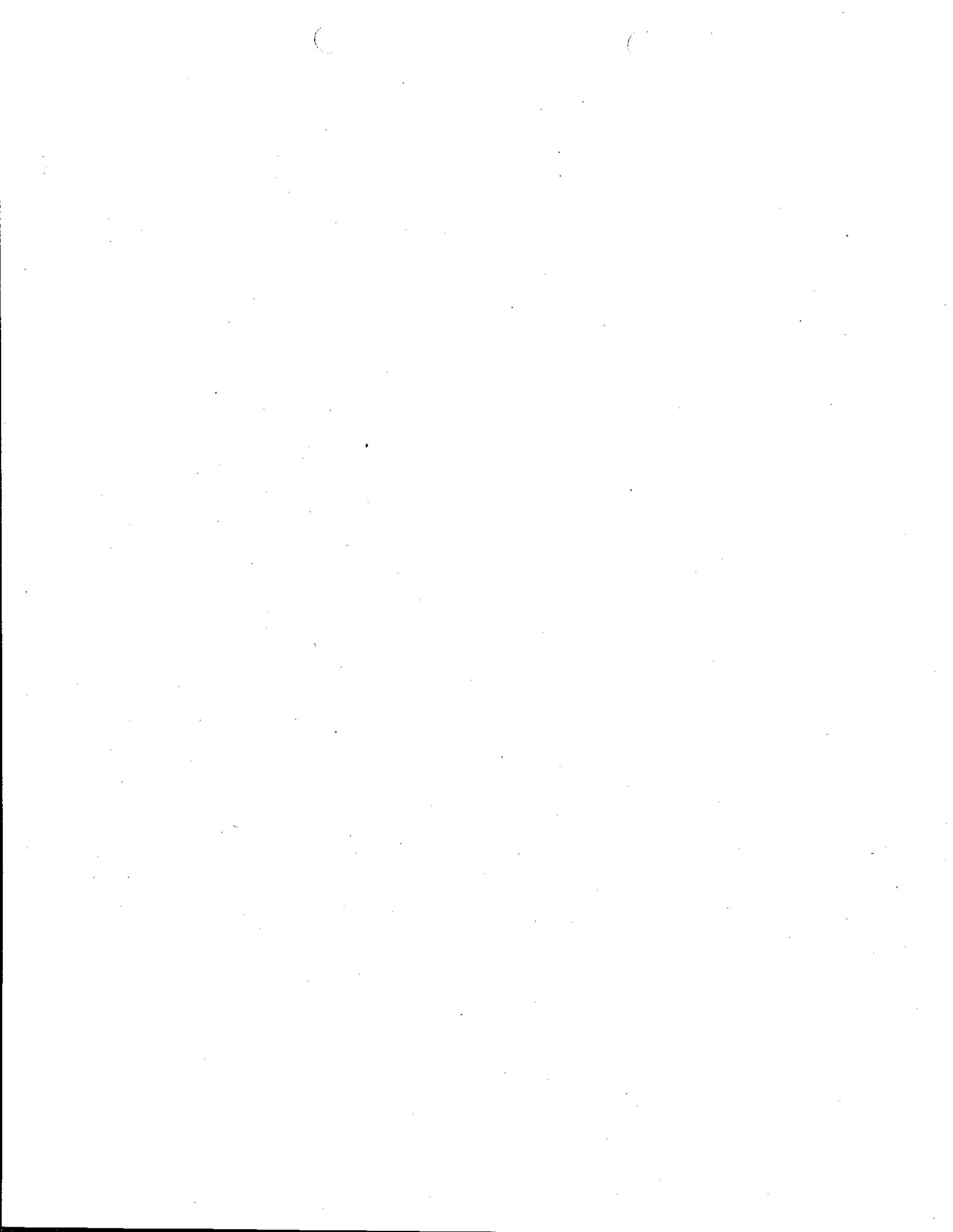
- Noise impact analyses, Beacon Street (proposed 11-story office building with helipad), San Pedro, California
- Noise and Diesel Air Toxic Analysis, Proposed Marin Airporter Bus Terminal, Novato, California
- Noise and air impact analysis, Polo Ranch (large residential project), Santa Cruz County, California
- Noise and air impact analysis, Auburn Business Center (proposed industrial park), Placer County, California

- Noise and air impact analysis, Campground and Resort (included woodsmoke), Mendocino County, California
- Noise and air impact analysis, Los Banos Bypass, Merced County, California
- Noise and air impact analysis, Clements Quarry (sand and gravel), San Joaquin County, California
- Noise and air impact analysis, Buena Vista Landfill (landfill expansion), Santa Cruz County, California
- Noise assessment, Solid Waste Transfer Station, Salinas, California
- Noise monitoring and complaint evaluation, Vashon Island Landfill, King County, Washington
- Noise impact analyses, Proposed Dam, Sonoma County, California
- Noise monitoring, various roadways (for landfill siting study), Whatcom County, Washington
- Noise monitoring, Waste Fibre Recovery Plant, Hayward, California
- Noise analysis, Panamint Valley Supersonic Operations, Inyo County, California
- Noise monitoring, Kings Beach community, California
- Noise monitoring, Safeway, South Lake Tahoe, California
- Noise monitoring, industrial facility, Fallon, Nevada
- Traffic noise analysis and sound wall evaluation, proposed new toll road (highway), Houston, Texas
- Ox Mountain Landfill, San Mateo County, California
- Noise monitoring, Chemical Manufacturing Site, San Jose, California
- NEPA EA's, ANR Gas Facilities (including 10 gas compressor stations), Eastern United States
- NEPA noise impact analysis, Pelican Butte Ski Area, Bend, Oregon
- EIR, Mobil Tank Farm (Marine Terminal lease renewal), Los Angeles Harbor, California
- EIR, Shell Oil Marine Terminal (lease renewal), Los Angeles Harbor, California
- EIR/EIS, Port of Oakland dredging project, San Francisco Bay Area, California
- EIR, Cold Storage and Shipping Facility, Monterey County, California
- EIR, Granite Regional Park (conversion of mining site to multi-use site), Sacramento, California
- Environmental assessment (EA), Tire-Derived Fuel Project, RMC Lonestar cement plant, Davenport, California
- EIR, Children's Hospital Incinerator, Los Angeles County, California
- EIR, Soledad Energy Plant (biomass plant), Soledad, California
- EIR, University of California at Davis Landfill (landfill expansion), Davis, California
- NEPA Environmental Impact Statement (EIS), Tungsten Mine and Processing Plant, Inyo County, California
- EA/Initial Study, Highway 89, Placer County, California
- Air quality and noise impact analyses, San Mateo-Hayward Bridge, San Mateo and Alameda Counties, California
- EIR, Decontamination and Waste Treatment Facility, Livermore, California
- Air quality and noise impact analyses, South Shore Club at Lake Don Pedro, Tuolumne/Mariposa Counties, California
- EIR, Vie Del Cogeneration Plants (coal-fired), Fresno County, California
- EIR, University of California, San Francisco, California
- EIR, GWF Power Plant Site 1A, Pittsburg, California
- Noise training, Shipyard, South San Francisco, California
- EA, Base Master Plan, Beale AFB
- EA, Los Angeles Air Force Base (two new hazardous waste/materials storage buildings)
- EA, Mail sorting facility, Beale AFB
- EA, New fire station, Beale AFB
- EA, Radio control tower, Beale AFB

REGISTRATIONS & AFFILIATIONS

- Certified Environmental Manager (CEM) – Nevada, since 2001
- Registered Environmental Assessor (REA) - California (No. 03414, since 1990)
- Qualified Environmental Professional (QEP) - Institute of Professional Environmental Practice (No. 12960268, since 1996); Nevada Regional Coordinator
- Air and Waste Management Association
- Certified Air Permit Professional, San Joaquin Valley Unified Air Pollution Control District – since 1998

Climate Change/Greenhouse Gases



East Brawley Geothermal Development Project Climate Change/Greenhouse Gases

**Prepared by Environmental Management Associates (EMA),
January 2010**

The Intergovernmental Panel on Climate Change, in its Fourth Assessment Report, stated that warming of the earth's climate system is unequivocal, and that warming is very likely due to anthropogenic greenhouse gases (GHG) concentrations.¹ DOE is not aware of any methodology to correlate the GHG emissions exclusively from the proposed project to any specific impact on global warming; however, studies such as the IPCC report support the premise that GHG emissions from the proposed project, together with global GHG emissions, would very likely have a cumulative impact on global warming. Although the project would contribute to cumulative increases in greenhouse gases and related climate change when combined with other projects globally, GHG emissions from the proposed action would be minimal.

GHG Emissions from Drilling and Testing

The principal source of GHG emissions that would occur during drilling operations would result from diesel fuel combustion to run the engines used by the drill rig. An estimated 205 metric tons of CO₂ would be released to run the large portable diesel engines used during the drilling of each well.² Assuming that up to 27 production wells and 32 injection wells will be required for the project, and that four existing exploration wells will be integrated into the project, then a total of 55 additional wells will be drilled for the project. This would result in a total release of about 11,275 metric tons of CO₂ over the life of the project from geothermal well drilling operations.

During geothermal well tests, the wells would be produced into portable steel tanks from which NCG in the geothermal fluid would be released to the atmosphere. The NCG is predominantly comprised of CO₂ with a tiny fraction of CH₄. It is estimated that the GHG emissions from well testing would total about 1.2 metric tons of CO₂e for each well tested.³ This would total approximately 66 metric tons of CO₂e over the life of the project from geothermal well testing operations.

GHG Emissions from Site Construction

GHG construction emissions would occur over an approximately 15-month period of power plant site preparation and construction. Well site construction would also occur

¹ Intergovernmental Panel on Climate Change. Fourth Assessment Report, Climate Change 2007: Synthesis Report, Summary for Policy Makers, released in Valencia, Spain, November 17, 2007.

² This estimate assumes approximately 1,000 gallons per day of diesel fuel are used over a 20-day drilling period for each well. EPA AP-42 (5th Edition) emission factors were used to calculate the CO₂ emissions from large stationary diesel engines.

³ This estimate assumes an average of approximately 6 hours of throttled steam flow per well test as observed during flow tests of the existing Brawley East River wells with an average 1.7×10^3 ppm CO₂ and 51 ppm CH₄ in the steam (Personal Communication - Skip Matlick, Ormat Nevada, Inc.; July 6, 2009).

during this same period and intermittently over the life of the project. Construction activities would be limited to an approximately 15-acre power plant site and a total of three acres of construction would occur for each well site (i.e., 2 acres per well pad and 1 acre of associated access road). The operation of construction equipment and vehicles would emit GHG due to combustion of fossil fuels, mainly CO₂, N₂O, and CH₄. The principal GHG that is emitted from construction sources is CO₂. The amounts of N₂O and CH₄ emitted from construction equipment and vehicle operations are much lower and, in conformance with California Air Pollution Control Officer's Association (CAPCOA) guidance, are considered negligible for the purposes of this analysis (CAPCOA 2008).

The Urban Emissions Model (URBEMIS), developed for the South Coast Air Quality Management District, was used to estimate the annual CO₂ emissions occurring during power plant site construction activities and well site construction activities.⁴ The model evaluates both emissions occurring from construction equipment and activities and the emissions from worker commutes and vendor vehicles trips to and from the construction site. Based on the results of the URBEMIS modeled construction activities, approximately 452 metric tons of CO₂ would be released during power plant site construction activities and 956 metric tons of CO₂ would be released during construction of 55 new well sites (165 acres). The total estimated emissions from power plant and well site construction activities are estimated to be approximately 1,400 metric tons of CO₂ over the life of the project.

GHG Emissions from Power Plant Operations

It has been generally demonstrated that substantially fewer greenhouse gases are released during the generation of electricity from geothermal power plant technologies than from electricity generated by fossil fuel combustion technologies (Table 8).

Table 7: General Comparison of Geothermal and Fossil Fuel CO₂ Emissions^a

	Geothermal ^b	Coal	Petroleum	Natural Gas
Emissions (lbs CO ₂ /kW-hr)	0.020	2.095	1.969	1.321
^a The geothermal emissions include weighted average values for all geothermal capacity, including binary power plants that do not typically emit CO ₂ . ^b Emissions of CO ₂ from geothermal power plants predominantly result from releases of noncondensable gases entrained in the geothermal fluid with negligible amounts from fuel combustion sources. Source: Bloomfield <i>et al.</i> 2003. <i>Geothermal Energy Reduces Greenhouse Gases</i> . Geothermal Resources Council Bulletin: March/April 2003.				

The estimates in Table 8 include the CO₂ emissions from geothermal power plants using all forms of existing geothermal development technologies including dry-steam and flashed-steam technologies. These technologies release NCG, including carbon dioxide,

⁴ The Urban Emissions Model (URBEMIS2007 v. 9.2.4), was used to quantify the anticipated GHG emissions resulting from the Brawley (East River) Geothermal Development Project during both power plant and well site construction activities (Rimpo 2007). The URBEMIS model does not contain emission factors for GHG other than CO₂, except methane (CH₄) from mobile-sources, which can be converted to CO₂ equivalents (CO₂e). However, this is not considered a major problem for land development projects because CO₂ is by far the most important GHG for these types of projects (CAPCOA 2008).

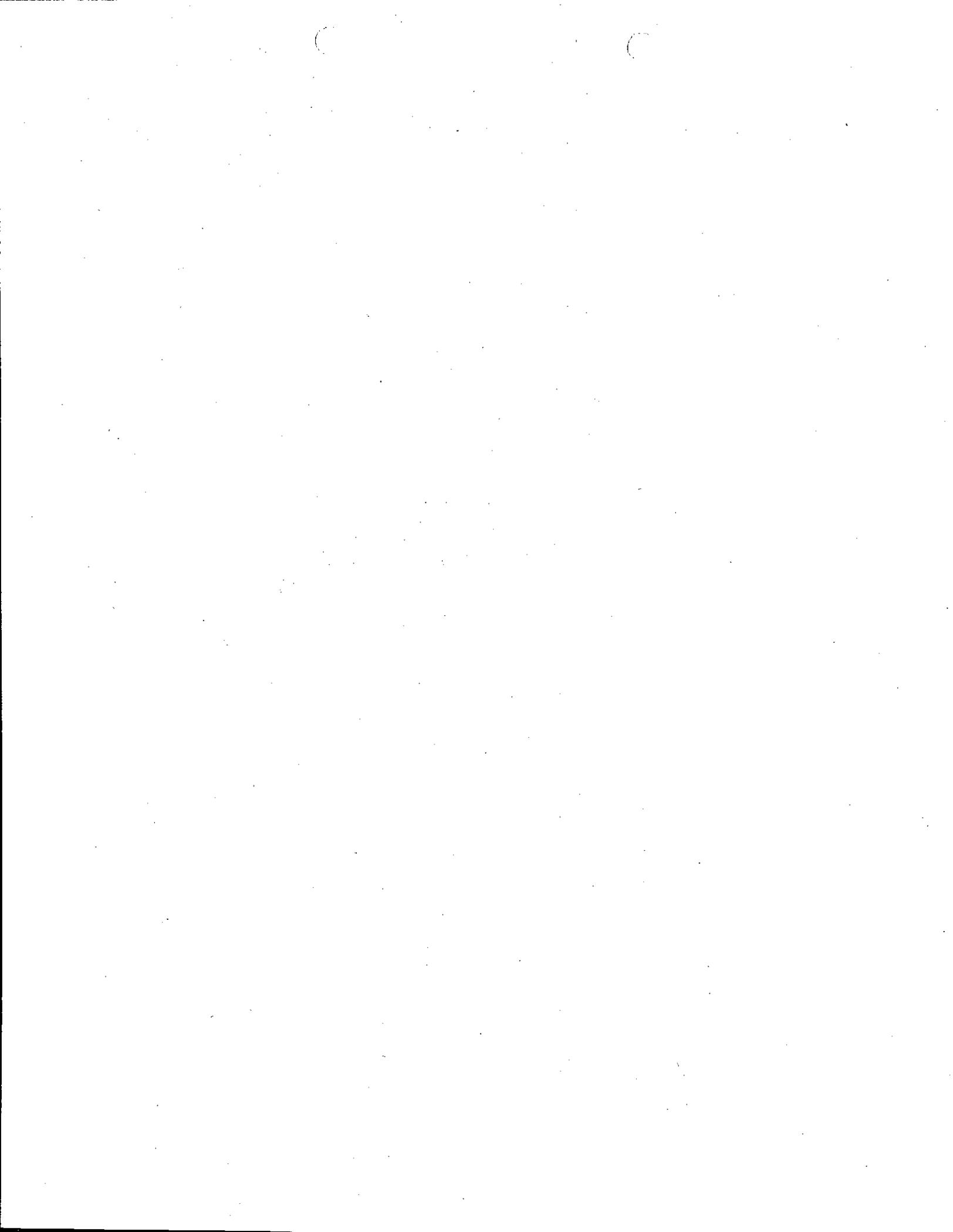
entrained in the geothermal fluid to the atmosphere. The binary technology proposed for the East Brawley Project is not expected to release NCG to the atmosphere during power plant operations. However, if the NCG content of the geothermal fluid cannot be adequately removed by the well pad separators then up to 25% of the geothermal fluid NCG will be transported to the power plant. In that event, essentially all of the CO₂ in NCG delivered to the power plant site would be released to the atmosphere along with a small additional amount of CO₂ and CH₄ generated during the combustion of NCG in the RTO/scrubber unit. This would amount to a maximum potential release of up to about 113,200 metric tons per year of CO₂e for a worst-case 49.9 MW power generation facility.

Table 9 provides a comparison of the GHG emissions from the East Brawley power generation operations with other energy technologies. The comparison clearly demonstrates that geothermal power generation, including the East Brawley Geothermal Development Project has substantial advantages over conventional fossil fuel power generation technologies with respect to GHG emissions.

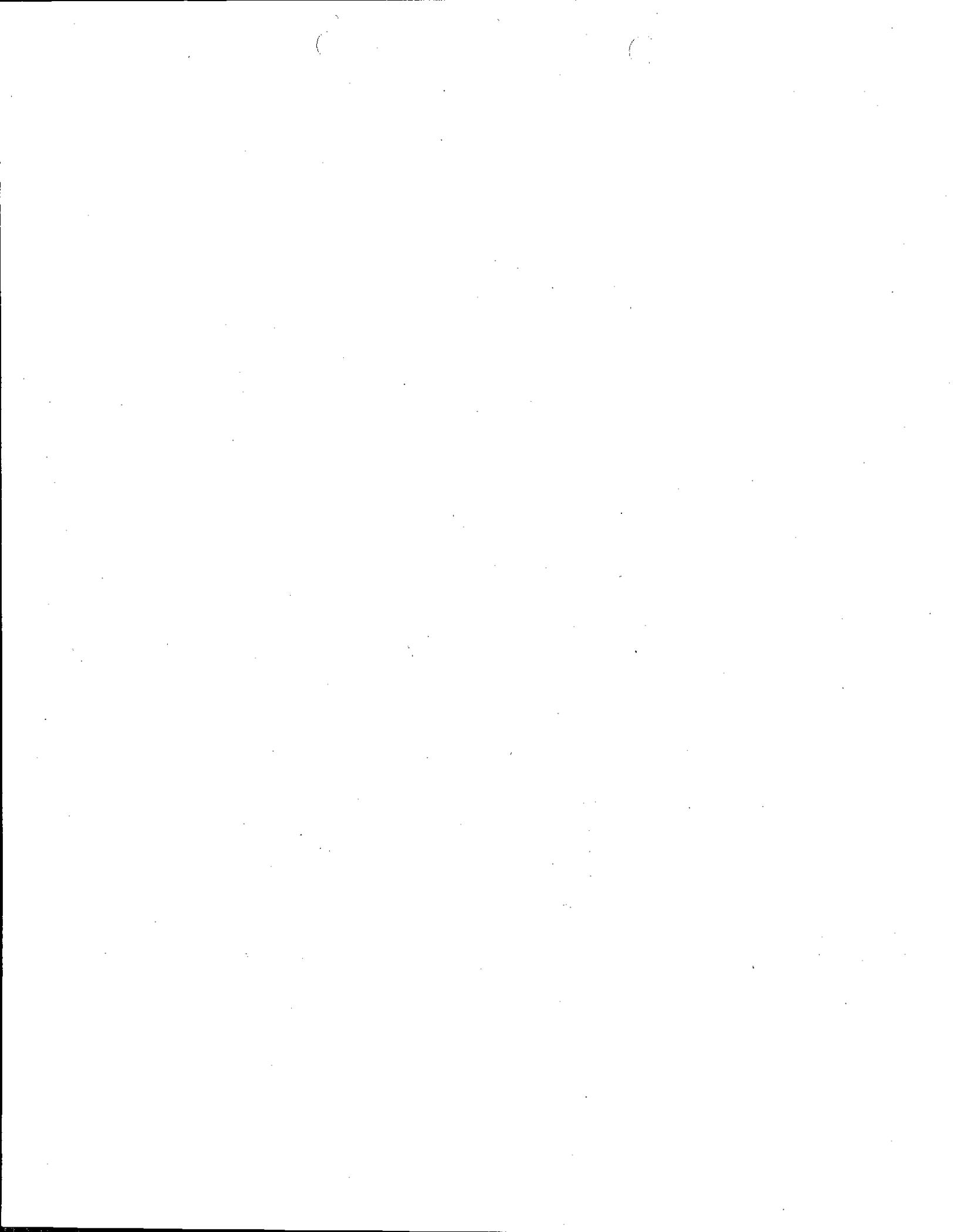
Table 8: Comparison of Representative Greenhouse Gas Emissions from the East Brawley Development Project with Alternative Power Generation Technologies

Power Generation Technologies	Greenhouse Gas Emissions ^d		
	Carbon Dioxide ^d (lbs/MWh)	Methane ^e (lbs/MWh)	CO ₂ e ^f (lbs/MWh)
Coal ^a	2,100	0	2,100
Oil ^a	1,970	0	1,970
Natural Gas ^a	1,320	0	1,320
Geothermal Steam Flash Projects ^b	270 (Average) 10-1,630 (Range)	ND ^g	270 (10-1,630)
East Brawley Binary Project ^c	0 to 430	0 to 10	0 to 630

^a Adapted from Bloomfield *et al.* 2003.
^b Adapted from Bertani 2002 (assumes the emissions are predominantly steam and steam flash geothermal projects – substantial variability based on NCG content of the respective geothermal reservoirs).
^c Project specific emissions calculated for the East Brawley Development Project. The range in GHG emissions is attributed to the uncertainty of whether excess NCG will be encountered which may need to be treated with emission abatement equipment as opposed to the planned subsurface injection of the all of the NCG with no CO₂ emissions. In addition, if no emission abatement is needed then there will be no RTO/scrubber emissions and no GHG emissions.
^d The global warming potential for CO₂ is 1.
^e The global warming potential factor for CH₄ is 21.
^f CO₂e is an acronym for Carbon Dioxide Equivalent, a standardized unit in which the global warming potential of different greenhouse gases is expressed relative to the global warming potential of carbon dioxide.
^g No data



Air Quality Analysis
+
APCD Application



ORMAT®



October 31, 2008

Mr. Brad Poiriez
Air Pollution Control Officer
Imperial County Air Pollution Control District
150 S. 9th Street
El Centro, CA 92243

Subject: Application for Authority to Construct for the East Brawley Geothermal Development Project

Dear Mr. Poiriez:

ORNI 19, LLC, a wholly owned subsidiary of Ornat Nevada Inc., is proposing the East Brawley Geothermal Development Project (Project or Facility), consisting of a new 49.9 MW (net) binary power plant; a geothermal well field (owned by ORNI 17, LLC), consisting of a total of up to 60 geothermal wells; pipelines to bring the geothermal fluids produced from the production wells to the power plant and spent geothermal fluids to the injection wells for injection into the geothermal reservoir; an interconnection transmission line to the Imperial Irrigation District's (IID's) existing electrical transmission system; and a water conveyance system to bring water from the IID's Rockwood Canal to the power plant to provide cooling water for the power plant.

The Project is located along Best Road, east of the New River, and north-northeast of the City of Brawley in Imperial County, California. The approximately 15 acre power plant site (which includes the substation and storm water retention basin) is located on private agriculture lands in the southeast corner of Section 15, Township 13 South, Range 14 East, SBB&M, identified as Assessor's Parcel Number (APN) 037-140-06-01, a parcel of 32.81 acres. The geothermal well field is also located on private agricultural lands in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, SBB&M.

Ormat anticipates that construction on the project would start during the fourth quarter of 2008, with commercial start-up before the end of 2009.

The Project will be essentially a twin of the North Brawley 1 geothermal power plant, which is currently completing construction approximately 1.75 miles to the west under Authority to Construct No. 3731A. As a result, the attached application follows the Application for Amendment to Authority to Construct No. 3731, submitted August 11, 2008 by ORNI 18, LLC and Ornat Nevada, Inc.

ORMAT NEVADA, INC.

4982 Hovley Rd. P.O. Box 1807 • Brawley, California 92227 • Telephone (760) 351-8555 • Facsimile (760) 351-8588

The OEC Unit working fluid (isopentane) is classified as an ozone precursor and the Project's average daily emissions of isopentane would be limited to 137 pounds or subject to the ICAPCD offset requirements. The OEC Vapor Recovery Units (VRUs) at the Gould 2 power plant at Heber 2 that Ormat operates in the Heber KGRA just south of the township of Heber have demonstrated better than 99.6% efficiency in controlling and recovering isopentane emissions during normal operations. Isopentane emissions occurring during major OEC Unit maintenance activities would be controlled and minimized by evacuating and compressing the isopentane vapors, returning the isopentane liquid to the OEC Unit and releasing the isopentane vapors which do not condense through the isopentane VRU, which would adsorb nearly all of the remaining isopentane vapors.

Diesel Engines: Diesel engines that run stationary construction and well-drilling equipment have the potential to emit nitrogen oxides (NO_x), reactive organic compounds (ROCs), carbon monoxide, sulfur oxides, and fine particulate matter (PM₁₀). These diesel engines would be registered with the California Statewide Portable Equipment Registration Program (PERP), or comply with the ICAPCD rules and regulations for emissions, BACT and offsets.

Health Risks: The Project would not expose sensitive receptors to substantial pollutant concentrations. The Project is located in a rural area with no nearby sensitive receptors (schools, pre-schools, hospitals, long-term care facilities, etc.). A health risk assessment prepared for the Project evaluated the potential health risks from the benzene and hydrogen sulfide emissions from the Project noncondensable gas scrubber vent stack consistent with the guidance in the CalEPA "Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments" (2003). The Project emissions of benzene and hydrogen sulfide produces modeled concentrations at the closest occupied residences and commercial/industrial facilities which are far below those at which any adverse acute (short-term) or chronic (long-term) health effects would be expected. A conservative calculation of the lifetime average daily dose of benzene at the maximally exposed individual resident receptor and the working lifetime average daily dose of benzene at the maximally exposed individual worker produced cancer risks that are generally found acceptable.

Impacts from Traffic: Site construction and drilling activities would generate a small number of daily one-way vehicle trips (as many as 40 or more trucks and 12-16 small trucks/service vehicles/worker vehicles on peak days). About 50-60 workers would commute to the Project during site construction, but these operations would be short-term and temporary. Truck, service vehicle and worker vehicle traffic during Project operations would be substantially smaller. The air pollutant emissions from these small numbers of vehicles would have a negligible impact on air quality in Imperial County.

Impacts from Odors: Project activities would not create objectionable odors affecting a substantial number of people. Minimal hydrogen sulfide (H₂S) emissions would be released during operation of the Project power plant, as the majority of the gas will be injected back into the geothermal reservoir via the injection or blowdown wells. Air quality modeling conducted for the Project documents that these power plant emissions of hydrogen sulfide from the scrubber stack would not produce hydrogen sulfide concentrations in excess of the state ambient air quality (odor) standard at any occupied residence. H₂S would also be emitted during well drilling and flow. However, the concentrations of H₂S measured in the geothermal fluids in the North Brawley geothermal area are low, and H₂S emissions during drilling and flow testing would be short-term and temporary (about 20 days).

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The enclosed application consists of a completed Authority to Construct Application form; supplemental Internal Combustion Engine Summary forms for the two emergency engines; a check for \$157.00 for the application processing fee; and an attachment to the ATC Application form which provides a complete description of the proposed project, projected air pollutant emission rates, an assessment of project compliance with the ICAPCD regulations, and a health risk assessment for the noncondensable gases emitted by the scrubber.

We understand that pursuant to District Rule 902, a synthetic minor permit requires a 30-day public notice and a 30-day review by the U.S. Environmental Protection Agency. We ask that the District schedule these two reviews to run concurrently, and take whatever additional steps may be possible to facilitate the timely review and approval of this permit application so that the construction of the modified facility can be completed as soon as possible.

Please call me at 760.351.8555 if you have any questions or need more information. We would also be happy to meet with you and your staff to review the project.

Sincerely,

Bob Sullivan

A handwritten signature in black ink, appearing to read 'B. Sullivan', with a long horizontal flourish extending to the right.

Project Manager

Enclosures (5)

cc: Dwight Carey, EMA (w/ Enclosures)
Ron Leiken, Ormat Nevada Inc. (w/ Enclosures)

ORMAT NEVADA, INC.

4982 Hovley Rd. P.O. Box 1807 • Brawley, California 92227 • Telephone (760) 351-8555 • Facsimile (760) 351-8588

150 South Ninth Street
El Centro, CA 92243
(760) 482-4606

IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT



APPLICATION FOR

- Authority to Construction
 Permit to Operate
 Emission Credit Banking \$85.00
 New
 Transfer of Ownership
 Change of Permit Conditions
 Amendment
 Relocation
 Equipment Modification or Addition
 Name change

PERMIT NUMBER (if any) N/A

1. Name of Applicant ORNI 19, LLC - ORMAT NEVADA, INC. 2. Responsible Person Bob Sullivan
3. Mailing Address 6225 Neil Road, Suite 300 4. Title Project Manager
5. City Reno State NV Zip Code 89511-1153 6. Phone (Area Code) 775.356.9029 Cell Phone (Area Code) 775.229.5199
7. Type of Organization (Corp., Government, Individual, etc.) Limited Liability Corporation - Corporation
8. Brief Description of Project/Activity East Brawley Geothermal Development Project-49.9 MW (net) binary power plant and geothermal well field
9. Location of Project/Activity North-northeast of the City of Brawley - Sections 10, 11, 14, 15, 16, 21, 22, and 23, T13S, R14E, SBB&M
10. Property Owner Loma Farms, Inc., PO Box 134, Brawley, CA 92227 (power plant site in Section 15)
11. Person in Charge at Location Bob Sullivan 12. Title Project Manager 13. Phone Number (Area Code) 775.229.5199
14. Anticipated Date of Construction Start Winter 2008 15. Anticipated Life of Project 30+ years
Completion Fall 2009
16. Estimated Emissions
For largest single pollutant ROC Uncontrolled lbs/day 406.40 Controlled lbs/day 151.04
Total for all emissions H2S/PM10/CO/NOx 51.96/53.06/4.41/7.14 10.90/53.06/4.41/7.14
17. Other Permits Have Been or Will be Obtained From: ICPDS, ICPWD, CRWQCB, IID, ICDHS-EHS, CDTSC, Caltrans, CSWRCB
18. Plot plans, flow charts, calculations, equipment description and other information required by "List and Criteria" attached.
19. The information previously submitted with _____ is still valid and no changes have been made except as shown on attachment.
20. Request for confidential handling of attached.
21. Total pages attached 80

"I am familiar with the Rules and Regulations of the Imperial County Air Pollution Control District and I certify that the operation of the plant and/or equipment which is subject to the application, will comply with said Rules and Regulations."

31 OCT 08

Date

Signature of Responsible Person

OFFICE USE ONLY: All payments must be made by Check or Money Order. Cash will not be accepted Thank you.
Note: An application fee of \$154.00 is due upon submission of an application.

Date application submitted: _____ Amount paid: _____
Received by: _____ Receipt Number: _____
Staff Comments: _____

AIR QUALITY ANALYSIS
In Support of the
CONDITIONAL USE PERMIT APPLICATION
EAST BRAWLEY
GEOTHERMAL DEVELOPMENT PROJECT

Prepared by:
Dwight L. Carey, D.Env., Principal
Environmental Management Associates, Inc.
October 30, 2008

Setting

The Project area is located in the Salton Sea Air Basin (SSAB) and is under the regulatory jurisdiction of the Imperial County Air Pollution Control District (ICAPCD) for the protection of air quality. The SSAB is classified as "non-attainment" for ozone and small particulate matter (PM₁₀) under both state and federal ambient air quality standards.

Projects which have the potential to emit regulated air pollutants must comply with ICAPCD rules and regulations. District Rule 207 (New Source Review) requires that any new or modified air pollution source emitting regulated air pollutants in excess of 25 pounds/day must utilize best available control technology (BACT). These sources must also "offset" emissions of regulated air pollutants associated with ozone or PM₁₀ in excess of 137 pounds/day at a rate of 1.2 or greater to 1.0. District Rule 216 (Construction or Reconstruction of Major Stationary Sources that Emit Hazardous Air Pollutants) requires owners and operators of stationary sources that could emit hazardous air pollutants (HAPs) above the level of a major source install best available control technology for toxics (T-BACT).

ICAPCD Regulation VIII (Fugitive Dust Requirements for Control of Fine Particulate Matter (PM₁₀)) requires specific actions by active operations to control the fugitive emission of fine particulate matter (fugitive dust, or PM₁₀). Fugitive dust emissions may result from earthmoving activities during construction; travel on unpaved roads; and from open areas following construction. To comply with the applicable sections of District Regulation VIII projects must prepare and implement a dust control plan and apply Best Available Control Technology (BACT) (such as watering or gravel) to reduce fugitive dust emissions.

Impacts

The Project would have negligible potential to conflict with or obstruct the implementation of the applicable state or ICAPCD air quality plans. California's State Implementation Plans (SIPs) are a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, state regulations and federal controls describing how the state will attain national ambient air quality standards (NAAQS) for ozone and PM₁₀. State law makes the California Air Resources Board (CARB) the lead agency for all purposes related to the SIP. Local air districts, including the ICAPCD, prepare SIP elements and submit them to CARB for

review and approval. Generally, project compliance with all of the ICAPCD rules and regulations results in conformance with the state and ICAPCD air quality plans.

The Project has prepared and submitted applications to the ICAPCD for permits (Authorities to Construct) for the Project power plant and production wells and injection wells which document how the Project would comply with all the applicable ICAPCD rules, regulations and requirements for controlling emissions of the non-attainment air pollutants and their precursors. The Project air pollutant emissions calculated in the submitted air permit applications are summarized in the following table:

Description	Facility Abated Emissions							
	PM10	SO2	CO	NOx	ROC	H2S	NH3	C6H6
Hourly PTE (lbs):	2.48	0.0122	4.41	7.14	88.02	0.53	7.67	0.79
Daily PTE (lbs):	53.06	0.0122	4.41	7.14	151.04	10.90	46.58	14.86
Annual PTE (tons):	9.64	0.0003	0.11	0.18	27.53	1.99	8.50	2.71

The Project daily potential to emit fine particulate matter (PM10) and reactive organic compounds (ROCs) are excess of 25 pounds, and require the implementation of best available control technology (BACT) in the form of high efficiency drift eliminator for the cooling towers, vapor recovery units (VRUs) for the OEC Units, and a scrubbing and injection system for control of the benzene (and hydrogen sulfide) in the geothermal noncondensable gases. The scrubbing and injection system for control of the benzene in the geothermal noncondensable gases is also considered T-BACT for these emissions. The project daily emissions of ROCs are also in excess of 137 pounds per day and require the purchase of about 0.77 tons per quarter of ROC offsets.

The Project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. Air quality modeling conducted for the Project documents that the power plant emissions of hydrogen sulfide from the scrubber stack would not produce hydrogen sulfide concentrations in excess of the state ambient air quality standard at any occupied residence.

The Project would also not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). Construction of the power plant, pipelines and wells would produce fugitive dust from surface disturbing activities and regulated air pollutants emissions, principally from diesel-powered equipment, worker vehicles and delivery trucks. ICAPCD Rule 800-805 (Fugitive Dust Requirements for Control of Fine Particulate Matter (PM10)) regulate fugitive dust emissions from construction and earthmoving activities, from carry out and track out, from open areas, and paved and unpaved roads. If necessary, Ormat would revise its current dust control plan and provide 10-day advance notice to the ICAPCD. During construction Ormat would apply BACT to limit dust emissions (such as watering the construction area at least twice a day; increasing watering frequency when winds exceed 15 mph; limiting vehicular speed to 15 mph on dirt roads and areas; and using gravel ramps at road entrances). After construction fugitive dust from open areas would be controlled through application and maintenance of water or dust suppressant(s) to all unvegetated areas, establishing vegetation on previously disturbed areas, or paving, applying and maintaining gravel, or applying and maintaining chemical stabilizers/suppressants.



INTERNAL COMBUSTION ENGINE SUMMARY FORM

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NOTICE

An application will not be processed unless ALL fields in "Section A" are complete.

Section A

Company/Agency	Phone Number
ORNI 19, LLC - ORMAT NEVADA, INC.	775.356.9029
Equipment Location	Existing Permit # (if any)
Section 15, Township 13 South, Range 14 East, SBB&M.	N/A
Engine Manufacturer	Model Number
Cummings	CFP83-F40
Engine Serial Number:	EPA/C.A.R.B. 12-character Engine Family Name
8728-6CTAAG3	Not Available
Manufacturer Date:	Is unit equipped with a non-resettable hour meter?
Model Year 2007	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Utilization of Engine	
<input type="checkbox"/> Electrical Generator <u>215</u> Kw <input checked="" type="checkbox"/> Fire Pump <input type="checkbox"/> Portable	
<input type="checkbox"/> Compressor Driver _____ cfm <input type="checkbox"/> Rental <input type="checkbox"/> Other _____	
<input type="checkbox"/> Pump Driver _____ gpm	
Fuel Information	Air to Fuel Ratio
<input type="checkbox"/> Natural Gas <input type="checkbox"/> Gasoline <input type="checkbox"/> LPG <input type="checkbox"/> Other _____	
<input type="checkbox"/> Digester Gas <input type="checkbox"/> Landfill Gas <input checked="" type="checkbox"/> Diesel Oil	
Engine Size (Manufacturers Rating)	BHP@ 288 RPM 1760
Operating Schedule	
1 Hr/Days _____ Days/Week	
_____ Weeks/Year Maximum Operating Hours 50 hrs Hrs/Days	
<input checked="" type="checkbox"/> Emergency Only (indicate hours operated for testing & maintenance)	

Section B

Is this unit designed to be moved or carried from one location to another, or does it have wheels, skids,
<input type="checkbox"/> Yes (Portable) <input checked="" type="checkbox"/> No (Stationary)



INTERNAL COMBUSTION ENGINE SUMMARY FORM

Page 2 of 2

Section C

Engine Description		Number of Cylinders:	
<input type="checkbox"/> Two Cycle	or	<input checked="" type="checkbox"/> Four Cycle	
<input type="checkbox"/> Lean Burn	or	<input type="checkbox"/> Rich Burn	
<input type="checkbox"/> Turbocharged	<input checked="" type="checkbox"/> Turbocharged/Aftercooled	<input type="checkbox"/> Naturally Aspirated	
Sulfur Content of Disgester Gas, Landfill Gas or Diesel			
CARB Diesel			
Maximum Rated Fuel Consumption (Gas/Hr. Cu. Ft/Hr)			
14.5 gph			
Average Load Percentage %			
Energy Recovery From Exhaust		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No If yes, please explain
Emission Control Device		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No If yes, please explain
Emission Data:			
POLLUTANT	EMISSION BEFORE CONTROL Gr/BHP PPM Lb/Day		EMISSION AFTER CONTROL Gr/BHP PPM Lb/Day
NMHC or TOC	0.14 g/kWhr		
NOx	5.37 g/kWhr		
CO	0.6 g/kWhr		
PM10	0.09 g/kWhr		
SOx	0.0074 g/kWhr		
		<input checked="" type="checkbox"/> Manufacturer Data	<input type="checkbox"/> Source Test Data

Section D

Stationary Engines Only			
Stack Dimensions			
Height Above Grade	<u>Approx. 8</u> Ft	Height Above Building	<u>N/A</u> Ft
Exhaust Cross Section			
Diameter	<u>4</u> In	Width	<u>N/A</u> In
		Length	<u>N/A</u> In
Exhaust Temperature	<u>952</u> °F	Direction of Stack Outlet	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical
			<input type="checkbox"/> Other
End of the Stack	<input type="checkbox"/> Open	<input type="checkbox"/> Capped	<input checked="" type="checkbox"/> Flapper Valve
Stack Serves			
<input checked="" type="checkbox"/> Only this equipment	Exhaust Flow	<u>1,632</u>	CFM
<input type="checkbox"/> Other equipment also	Total Flow Rate	<u>1,632</u>	CFM
	Exhaust Pressure	<u>0 psig</u>	CFM
Receptor Information. A receptor is a residence or business whose occupants could be exposed to toxic emissions from your facility.			
Nearest offsite receptor <u>Home</u>			
Distance to nearest offsite receptor	<u>2,000</u>	feet	
Distance to nearest school grounds	<u>10,000</u>	feet	

Dwight L. Carey
 Name of preparer

10/30/08
 Date



INTERNAL COMBUSTION ENGINE SUMMARY FORM

Page 1 of 2

NOTICE

An application will not be processed unless ALL fields in "Section A" are complete.

Section A

Company/Agency ORNI 19, LLC - ORMAT NEVADA, INC.	Phone Number 775.356.9029
Equipment Location Section 15, Township 13 South, Range 14 East, SBB&M.	Existing Permit # (if any) N/A
Engine Manufacturer Caterpillar	Model Number C15
Engine Serial Number: FSE02024	EPA/C.A.R.B. 12-character Engine Family Name 7CPXL15.2ESK
Manufacturer Date: Model Year 2007	Is unit equipped with a non-resettable hour meter? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Utilization of Engine <input checked="" type="checkbox"/> Electrical Generator 535 Kw <input type="checkbox"/> Compressor Driver _____ cfm <input type="checkbox"/> Pump Driver _____ gpm	<input type="checkbox"/> Fire Pump <input type="checkbox"/> Portable <input type="checkbox"/> Rental <input type="checkbox"/> Other _____
Fuel Information <input type="checkbox"/> Natural Gas <input type="checkbox"/> Gasoline <input type="checkbox"/> Digester Gas <input type="checkbox"/> Landfill Gas	Air to Fuel Ratio _____ <input type="checkbox"/> LPG <input type="checkbox"/> Other _____ <input checked="" type="checkbox"/> Diesel Oil
Engine Size (Manufacturers Rating) BHP@717	RPM 1800
Operating Schedule 1 Hr/Days _____ Days/Week _____ Weeks/Year Maximum Operating Hours 50 hrs _____ Hrs/Days	
<input checked="" type="checkbox"/> Emergency Only (indicate hours operated for testing & maintenance)	

Section B

Is this unit designed to be moved or carried from one location to another, or does it have wheels, skids, <input type="checkbox"/> Yes (Portable) <input checked="" type="checkbox"/> No (Stationary)
--



INTERNAL COMBUSTION ENGINE SUMMARY FORM

Page 2 of 2

Section C

Engine Description		Number of Cylinders:	
<input type="checkbox"/> Two Cycle	or	<input checked="" type="checkbox"/> Four Cycle	
<input type="checkbox"/> Lean Burn	or	<input type="checkbox"/> Rich Burn	
<input type="checkbox"/> Turbocharged	<input checked="" type="checkbox"/> Turbocharged/Aftercooled	<input type="checkbox"/> Naturally Aspirated	
Sulfur Content of Disgester Gas, Landfill Gas or Diesel			
CARB Diesel			
Maximum Rated Fuel Consumption (Gas/Hr, Cu. Ft/Hr) 241.7 lbs/hr			
Average Load Percentage %			
Energy Recovery From Exhaust		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No If yes, please explain
Emission Control Device		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No If yes, please explain
Emission Data:			
POLLUTANT	EMISSION BEFORE CONTROL Gr/BHP PPM Lb/Day	EMISSION AFTER CONTROL Gr/BHP PPM Lb/Day	
NMHC or TOC	CARB Tier 3 Standard = NMHC+NOx=4 g/kWhr		
NOx	CARB Tier 3 Standard = NMHC+NOx=4 g/kWhr		
CO	CARB Tier 3 Standard = 3.5 g/kWhr		
PM10	CARB Tier 3 Standard = 0.20 g/kWhr		
SOx	0.0074 g/kWhr		
<input checked="" type="checkbox"/> Manufacturer Data		<input type="checkbox"/> Source Test Data	

Section D

Stationary Engines Only			
Stack Dimensions			
Height Above Grade	Approx. 10 Ft	Height Above Building	N/A Ft
Exhaust Cross Section			
Diameter	8 In	Width	N/A In
		Length	N/A In
Exhaust Temperature	942 °F	Direction of Stack Outlet	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical
			<input type="checkbox"/> Other
End of the Stack	<input type="checkbox"/> Open <input type="checkbox"/> Capped	<input checked="" type="checkbox"/> Flapper Valve	
Stack Serves			
<input checked="" type="checkbox"/> Only this equipment	Exhaust Flow	3.845	CFM
<input type="checkbox"/> Other equipment also	Total Flow Rate	3.845	CFM
	Exhaust Pressure	0 psig	CFM
Receptor Information. A receptor is a residence or business whose occupants could be exposed to toxic emissions from your facility.			
Nearest offsite receptor Home			
Distance to nearest offsite receptor		2,000	feet
Distance to nearest school grounds		10,000	feet

Dwight L. Carey
 Name of preparer

10/30/08
 Date

ATTACHMENT 1
APPLICATION FOR AUTHORITY TO CONSTRUCT
ORNI 19, LLC – ORMAT NEVADA, INC.
EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT

ATTACHMENT 1
APPLICATION FOR AUTHORITY TO CONSTRUCT
ORNI 19, LLC – ORMAT NEVADA, INC.
EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT

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East Brawley Geothermal Development Project – Attachment 1
Application for Authority to Construct

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ATTACHMENT 1
APPLICATION FOR AUTHORITY TO CONSTRUCT
ORNI 19, LLC – ORMAT NEVADA, INC.
EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT

INTRODUCTION

ORNI 19, LLC, a wholly owned subsidiary of Ormat Nevada Inc., is proposing the East Brawley Geothermal Development Project (Project or Facility), consisting of a new 49.9 MW (net) binary power plant; a geothermal well field (owned by ORNI 17, LLC), consisting of a total of up to 40 geothermal wells; pipelines to bring the geothermal fluids produced from the production wells to the power plant and spent geothermal fluids to the injection wells for injection into the geothermal reservoir; an interconnection transmission line to the Imperial Irrigation District's existing electrical transmission system; and a water conveyance system to bring water from the IID's Rockwood Canal to the power plant to provide cooling water for the power plant.

The Project is located along Best Road, east of the New River, and north-northeast of the City of Brawley in Imperial County, California (see Figure 1). The approximately 15 acre power plant site (which includes the substation and storm water retention basin) is located on private agriculture lands in the southeast corner of Section 15, Township 13 South, Range 14 East, SBB&M, identified as Assessor's Parcel Number (APN) 037-140-06-01, a parcel of 32.81 acres (see Figure 2). The geothermal well field is also located on private agricultural lands in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, SBB&M (see Figure 3).

Ormat anticipates that construction on the project would start during the fourth quarter of 2008, with commercial start-up before the end of 2009.

The Project will be essentially a twin of the North Brawley 1 geothermal power plant, which is currently completing construction approximately 1.75 miles to the west under Authority to Construct No. 3731A. As a result, this application follows the Application for Amendment to Authority to Construct No. 3731, submitted August 11, 2008 by ORNI 18, LLC and Ormat Nevada, Inc. Like the North Brawley 1 Project, the well field for the East Brawley Project will be owned by ORNI 17, LLC, which is filing a separate application for an amendment to Authority to Construct No. 3783 to drill and test the wells required for the East Brawley Project.

EQUIPMENT AND SYSTEM DESCRIPTIONS

The Project consists of the following existing and proposed equipment:

- a new 49.9 MW (net) binary power plant, consisting of:
 - six 12.5 MW (gross) binary Ormat Energy Converter (OEC) Units (OEC Units 1 through 6), each with vaporizers, turbines, generators, condensers, preheaters, pumps, and piping (manufactured by Ormat Turbines Ltd.);
 - two 12,000 gallon motive fluid (isopentane) storage tanks;

East Brawley Geothermal Development Project – Attachment I
Application for Authority to Construct

- integrated OEC Unit motive fluid (isopentane) vapor recovery systems on each OEC Unit condenser (manufactured by Ormat Turbines Ltd.);
- a maintenance vapor recovery unit, consisting of a diaphragm pump, a vacuum pump, and activated carbon canisters (manufactured by Ormat Turbines Ltd.);
- two film, counter-flow, induced-draft cooling towers (each with seven to ten cells), each circulating a maximum of 110,000 gpm of cooling water (manufactured by Cooling Tower Depot, Inc.);
- two to four cooling water blowdown injection wells;
- a geothermal noncondensable gas scrubbing/abatement system;
- a control room, office, and maintenance shop;
- an electrical substation;
- a 215 kW emergency standby diesel engine fire-water pump (manufactured by Daybreak Technologies, Inc.);
- a 625 kVA/535 kW emergency standby diesel engine-generator to supply electrical power for plant auxiliaries when the plant trips (manufactured by Hawthorn Power Systems); and
- other related ancillary equipment;
- a geothermal well field, consisting of a total of up to 60 geothermal wells:
 - Up to 30 geothermal fluid production wells, each about 4,500 feet deep, with associated electrically powered pumps, well pad piping, sand separators to remove sand from the produced geothermal fluid, electrical power supply, geothermal noncondensable gas separators and related ancillary equipment (tanks, valves, controls, and flow monitoring devices), and
 - Up to 30 geothermal fluid injection wells, each about 4,500 feet deep, with associated well pad piping, electrical power supply and related ancillary equipment (tanks, valves, controls, and flow monitoring devices);
- separate pipelines to bring the geothermal fluids and separated noncondensable gases produced from the production wells to the power plant and spent geothermal fluids to the injection wells for injection into the geothermal reservoir;
- an approximately two-mile long 92 kv/13.8 kV transmission interconnection line to the North Brawley I substation;
- a communication tower on the plant site to facilitate communications with a central Ormat Nevada, Inc. Imperial Valley control room; and
- a water conveyance system to bring water from the Imperial Irrigation District (IID) Rockwood Canal to the power plant to provide cooling water for the power plant.

Like the North Brawley I Project, the East Brawley Project consists of four principal systems: the geothermal fluid system, the motive fluid system, the cooling water system and the geothermal noncondensable gas system. Although the geothermal fluid system and the motive fluid system are each generally closed systems, each would emit small quantities of air contaminants during normal and maintenance operations. The cooling water system and the geothermal noncondensable gas system are at least partially open to the atmosphere.

East Brawley Geothermal Development Project – Attachment 1
Application for Authority to Construct

Figure 4 shows the general arrangement of the Project power plant facilities. Figure 5 and Figure 6 are basic block diagrams of the power plant, which each shows how the three separate power plant fluid systems (geothermal fluid, motive (working) fluid and cooling water) flow through each of the six OEC Units. Figure 7 shows a perspective view of one of the six OEC Units. Each of the six OEC Units would be able to operate independently of the others, but would share common ancillary components (additional working fluid storage, geothermal fluid supply and injection, etc.). Figure 8 presents the process flow diagram for the geothermal noncondensable gas separation and scrubbing system.

Geothermal resources required to power the power plant would be supplied from a total of up to 30 geothermal production wells (see Figure 3). Each production well would be equipped with a pump driven by a vertical electric motor located on top of the well pump discharge head and corrosion and scale inhibitor systems to deliver corrosion and scale inhibitors into the geothermal fluid. An electric cable installed along the production pipeline from the power plant would provide the electricity to power the well pump motor.

Each of the production wells would deliver geothermal fluid to the power plant through production pipelines. The geothermal fluids would first flow from the production wells through closed, high pressure well pad separators which would separate most of the geothermal noncondensable gases from the geothermal brine (see Figure 8). Approximately twenty-five percent of these separated geothermal noncondensable gases would flow through dedicated pipelines to the geothermal noncondensable gas scrubbing system located at the power plant site. The remaining approximately seventy-five percent of the separated geothermal noncondensable gases would flow through other dedicated pipelines to be dissolved/entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. Small quantities of these separated geothermal noncondensable gases would be discharged to the atmosphere along the dedicated pipelines as condensate created as the gases cool is drained from the pipeline.

The geothermal brine and the geothermal noncondensable gases remaining in the geothermal brine would then flow through sand separators at each well pad to remove sand and other debris from the produced geothermal fluid. These sand separators would discharge a small amount of geothermal fluid and accompanying geothermal noncondensable gases when purging the sand. The produced geothermal fluid would then proceed through booster pumps and the geothermal fluid pipelines to the power plant site, then through the OEC units and into the geothermal injection wells without coming into direct contact with the motive fluid or the atmosphere.

The produced geothermal fluid would flow through the level 1 and level 2 vaporizers and preheaters of each OEC Unit, transferring the heat to the motive (working) fluid through the OEC Unit shell-and-tube heat exchangers. Injection pumps located at the power plant site would pump the geothermal injection fluid through the injection pipeline system, providing sufficient pressure to inject the cooled geothermal fluid back into the geothermal reservoir through the up to 30 injection wells.

The Project would use isopentane as the motive (working fluid). The isopentane working fluid vaporized from each OEC Unit level 1 and level 2 vaporizers would turn each OEC Unit level 1 and level 2 turbine, which together would turn a common generator, which would produce the electrical energy which would be delivered to the existing IID electrical transmission systems

East Brawley Geothermal Development Project – Attachment I
Application for Authority to Construct

through the North Brawley 1 substation. The isopentane vapor exiting each turbine would be condensed in a shell-and-tube condenser and returned to the preheaters and vaporizers to repeat the essentially closed cycle.

Each OEC Unit would contain approximately 23,000 gallons of isopentane (in the vaporizers, preheaters, condensers and piping). Each OEC Unit would have minor leaks of isopentane from the valves, connections, seals, and tubes which would be released either to the atmosphere or into the geothermal fluid or circulating cooling water lines. Power plant operators would frequently inspect and monitor the OEC Units for isopentane leaks and visual signs of fugitive isopentane emissions.

Small amounts of air or water vapor typically leak into the OEC Unit isopentane system in the condensers and would eventually reduce the operating efficiency of the OEC Unit unless removed. In order to remove these noncondensable gases, each OEC condenser would have a small (~0.106 scf) "OEC vapor recovery unit" (OEC VRU) integrated into the condenser. Each OEC VRU would consist of two chambers and a set of isolation valves. Operation of each OEC VRU would be controlled by the power plant computer control system, which would start the OEC VRU noncondensable gas "purge" sequence whenever the efficiency of the OEC Unit fell below a set point. During "purging," nearly all of the isopentane vapors in the OEC VRU would be compressed into liquid isopentane and returned to the OEC Unit, while the noncondensable gases, together with a small quantity of isopentane vapors, are discharged to the atmosphere.

Some OEC Unit major maintenance activities require that at least a portion of an OEC Unit be cleared of isopentane liquid and vapors prior to performing the maintenance activities. To control and minimize isopentane emissions during these infrequent major maintenance activities, the liquid isopentane would first be drained from the section of the OEC Unit (preheater, vaporizer or condenser) to be maintained or repaired and transferred to either another section of the OEC Unit, the isopentane storage tanks, or another OEC Unit. The Maintenance VRU diaphragm pump and vacuum pump would then be used to evacuate and compress most of the remaining isopentane vapors, returning the isopentane liquid to the other sections of the OEC Unit, the isopentane storage tanks, or another OEC Unit. Those isopentane vapors which do not condense would be released to the atmosphere through the Maintenance VRU activated carbon canisters, which would adsorb nearly all of the remaining isopentane vapors.

The shell-and-tube isopentane vapor condensers would be cooled by water circulated from the two cooling towers. Water from the condensers would be cooled in the cooling towers through evaporation of a portion of the circulating cooling water as the water falls through the air drawn into the cooling towers by the cooling tower fans atop each cooling tower cell. A much smaller portion of the circulating cooling water would also be lost as water droplets ("drift") through the top of the cooling tower cells. The cooling towers would be constructed with high efficiency drift eliminators to reduce the quantity of emitted drift. Some of the circulating cooling water would also be injected into the geothermal reservoir with the geothermal injection fluid or through one or more dedicated blowdown injection wells to remove dissolved salts which would be concentrated in the cooling water through the evaporation process. Cooling tower make-up water to replace the water lost through evaporation, drift and blowdown would be obtained under contract from the IID agricultural water system.

East Brawley Geothermal Development Project – Attachment 1
Application for Authority to Construct

Approximately twenty-five percent of the geothermal noncondensable gases separated at each of the well pads would be delivered through dedicated noncondensable gas pipelines to the geothermal noncondensable gas scrubbing system located at the power plant site (see Figure 8). These noncondensable gases would be treated by a gas scrubber, which would remove most of the hydrogen sulfide and benzene, and some of the carbon dioxide, by scrubbing the gases with the cooling tower blowdown water. The scrubbed gases which dissolve in the cooling tower blowdown water would be injected with the cooling tower blowdown water into dedicated injection well(s). The scrubbed noncondensable gases which do not dissolve in the scrubbing liquid would be discharge to the atmosphere through a vent gas stack.

APPLICABLE REGULATIONS

The following Imperial County Air Pollution Control District (ICAPCD) regulations apply to the proposed Project.

Rule 201 Permits Required

Except as exempted, new or modified sources which may emit or control air contaminants must obtain written authorization from the ICAPCD prior to construction.

Rule 206 Processing of Applications

Rule 206.A.4.c provides that the Air Pollution Control Officer shall take reasonable steps to insure that no Project will emit air contaminants that may endanger the short or long term health, safety or property of Persons.

Rule 207 New and Modified Stationary Source Review

Rule 207 limits the permitted increases of air pollutants that could interfere with the attainment or maintenance of ambient air quality standards.

- Rule 207.C.1.a requires Best Available Control Technology (BACT) for equipment with the potential to emit 25 pounds per day or more of any nonattainment pollutant or its precursors. (Ozone and fine particulate matter (PM10) are nonattainment pollutants in Imperial County, and reactive organic compounds [ROCs, which are most hydrocarbons], nitrogen oxides [NOx] and sulfur oxides [SOx] are precursors to ozone [ROCs] and PM10 [ROCs, NOx and SOx].)
- Rule 207.C.1.c requires Best Available Control Technology (BACT) for equipment with the potential to emit 55 pounds per day or more of hydrogen sulfide or the potential to emit 550 pounds per day or more of carbon monoxide (CO) in attainment areas.
- Rule 207.C.2.a requires offsets for all emissions of ROCs, PM10 and other nonattainment pollutants from a source that exceed 137 pounds per day.
- Rule 207.C.f allows the Air Pollution Control Officer to exempt equipment from the requirements of Rule 207.C.2. if used exclusively as emergency standby equipment for non-utility electrical power generation and not used in conjunction with any utility voluntary demand reduction program, provided that operation for maintenance purposes shall be limited to 100 hours per year, and operation for other than maintenance purposes shall be limited to Actual Interruptions of Power by the serving utility.

East Brawley Geothermal Development Project – Attachment 1
Application for Authority to Construct

- Rule 208 Permit to Operate
- The ICAPCD may inspect and evaluate the new equipment prior to allowing the project to operate under its Permit to Operate.
- Rule 216 Construction or Reconstruction of Major Stationary Sources that Emit Hazardous Air Pollutants
- Requires stationary sources of hazardous air pollutants to install best available control technology for toxics (T-BACT) to any constructed major source.
- Rule 400 Fuel Burning Equipment – Oxides of Nitrogen
- This rule requires that the discharge of NO_x from fuel burning equipment not exceed 140 lb/hour. Rule 400 also requires that all fuel burning equipment demonstrate compliance through compliance testing once every 12 months, except that equipment that operates less than 100 hours per 12 month period and emits less than 5 tons NO_x shall be tested not less than every 36 months.
- Rule 401 Opacity of Emissions
- The opacity of the emissions for the new source, other than uncombined water vapor, may not be as dark or darker as designated as No. 1 on the Ringlemann Chart (20% opacity) for more than 3 minutes in an hour.
- Rule 403 General Limitations on the Discharge of Air Contaminants
- The limitation in Rule 403 establishes maximum emission rates for particulate matter that vary according to the weight of the materials processed and maximum rates for the discharge of air contaminants that vary according to the volume of dry gases discharged.
- Rule 405 Sulfur Compounds Emission Standards, Limitations and Prohibitions
- Rule 405 prohibits the discharge into the atmosphere emissions of sulfur compounds, calculated as sulfur dioxide, in excess of 0.2 percent by volume, measured at the point of discharge.
- Rule 800-805 Fugitive Dust Requirements for Control of Fine Particulate Matter (PM₁₀)
- These rules control fugitive dust emissions from construction and earthmoving activities, from carry out and track out, from open areas, and paved and unpaved roads.
- Rule 900 - Procedures for Issuing Permits to Operate for Sources Subject to Title V of the Federal Clean Air Act Amendments of 1990
- Sources subject to Rule 900 include major sources. Rule 900.B.20 defines “major source” as a stationary source which has the potential to emit a regulated air

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pollutant or a hazardous air pollutant (HAP) in quantities equal to or exceeding the lesser of any of the following thresholds:

- 100 tons per year (tpy) of any regulated air pollutant;
- 10 tpy of one HAP or 25 tpy of two or more HAPs; or
- Any lesser quantity threshold promulgated by the U.S. EPA.

Rule 902 - Request for Synthetic Minor Source Status

This rule authorizes the owners or operators of specified stationary sources that would otherwise be major sources (pursuant to Rule 900) to request and accept federally-enforceable emissions limits sufficient to allow the sources to be considered “synthetic minor sources.”

Rule 1101 New Source Performance Standards (NSPS)

Rule 1101 adopts by reference and incorporates the provisions of Part 60, Chapter I, Title 40 of the Code of Federal Regulations (40 CFR Part 60) into the Rules and Regulations of the Imperial County Air Pollution Control District, and incorporates in its entirety Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

40 CFR Part 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines) applies to only stationary diesel engines which were ordered after July 11, 2005 and were manufactured after April 1, 2006 (if not a fire water pump engine) or after July 1, 2006 (if a fire water pump engine). Owners and operators of stationary emergency diesel engines of 2007 model year and later subject to 40 CFR Part 60, Subpart IIII must:

- Comply with the emission standards for new nonroad diesel engines in 40 CFR 60.4202, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary diesel engines;
- Operate and maintain the diesel engines according to the manufacturer’s written instructions over the entire life of each engine;
- Use fuel which meets the minimum standards set forth in the regulations;
- Install a non-resettable hour meter prior to startup of each engine;
- Limit maintenance checks and readiness testing of each engine to 100 hours per year (there is no time limit on the use of an emergency engine in emergency situations); and

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- Keep records of the operation of each engine in emergency and non-emergency service that are recorded through the non-resettable hour meter, including recording the time of operation of each engine and the reason each engine was in operation during that time.

Rule 1002 California Airborne Toxic Control Measures (ATCM)

These regulations adopt the following California Code of Regulations (CCR) titles applicable to the proposed project:

Section 93114 – Standards for Non-vehicular Diesel Fuel

Requires 15 ppm sulfur diesel fuel for use in all non-vehicular engines except locomotives and marine engines.

Section 93115 – Airborne Toxic Control Measures (ATCM) for Stationary Compression Ignition Engines.

Requires that new stationary emergency standby diesel-fueled engines >50 hp that operate no more than 50 hours per year for maintenance and testing emit diesel PM at a rate less than or equal to 0.15 g/bhp-hr and meet the standards for off-road engines in Title 13, CCR Section 2423. The ATCM does not limit emissions during emergency use and compliance testing. Lower emissions rates for PM apply to engines that operate between 50 and 100 hours per year.

Rule 1003 Hexavalent Chromium Emissions from Cooling Towers

Rule 1003 applies to all cooling towers. Since the new cooling tower cells will be made of reinforced fiberglass and not wood and since additives containing hexavalent chromium will not be used at the site, the facilities will be eligible for exemption from testing requirements.

POTENTIAL TO EMIT AND ABATED EMISSIONS FROM PROJECT OPERATIONS

Project operations would create sources of hydrogen sulfide (H₂S), ROCs (benzene (C₆H₆)) and hazardous air pollutant (HAP) (C₆H₆) emissions from the geothermal noncondensable gases through the plant noncondensable gas scrubber, the noncondensable gas pipeline condensate drains and the sand separators; ROCs (isopentane) from the OEC Units, the OEC VRUs and the Maintenance VRU; particulates from the cooling towers; and NO_x, ROCs, CO, and PM from the emergency standby diesel engine-generator and the emergency standby fire pump diesel engine.

Geothermal Noncondensable Gas Scrubber

Engineering estimates of the twenty-five percent of the geothermal noncondensable gases which would be delivered to the scrubber, based on the flow testing of the North Brawley I Project wells conducted during 2007 and 2008, are about 28,100 lbs/hr. Approximately 99.95 percent of these gases would be carbon dioxide, methane and nitrogen, with the remainder consisting principally of C₆H₆, H₂S and ammonia. Table 1 lists the hourly, daily and annual potential to emit these gases sent to the scrubber (see also Figure 8 and APPENDIX A).

The scrubber would remove all of the ammonia, at least 95 percent of the C₆H₆, about 80 percent of the H₂S and some of the carbon dioxide, by dissolving the gases in the scrubbing liquid (see APPENDIX B for a discussion of the scrubbing process), which would then be injected into the geothermal reservoir. Total scrubbed geothermal noncondensable gases which would be released to the atmosphere from the gas scrubber, based on the solubility of the various gases in the scrubber liquid with factors of safety added, is about 21,900 lbs/hr, with over 99.99 percent of these emitted gases being carbon dioxide, methane and nitrogen produced from the geothermal reservoir. Table 2 lists the hourly, daily and annual abated emissions of these gases from the scrubber vent stack (see also Figure 8 and APPENDIX A). Ammonia emissions from the gas scrubbing system are expected to be negligible as all of the ammonia in the separated noncondensable gases is expected to dissolve in the scrubber liquid and be injected into the geothermal reservoir.

Table 1: Noncondensable Gas Scrubber Potential to Emit

Noncondensable Gas Scrubber	Potential to Emit			
	H ₂ S	ROC	C ₆ H ₆	NH ₃
Hourly PTE (lbs):	2.14	11.20	11.20	14.60
Daily PTE (lbs):	51.32	268.80	268.80	350.29
Annual PTE (tons):	9.37	49.06	49.06	63.93

Table 2: Noncondensable Gas Scrubber Abated Emissions

Noncondensable Gas Scrubber	Abated Emissions			
	H ₂ S	ROC	C ₆ H ₆	NH ₃
Hourly Emissions (lbs):	0.43	0.56	0.56	0.00
Daily Emissions (lbs):	10.26	13.44	13.44	0.00
Annual Emissions (tons):	1.87	2.45	2.45	0.00

Sand Separators

The Project would release up to 300 gallons of separated geothermal brine containing up to 2.9 ppm of hydrogen sulfide, 6.5 ppm benzene and 212.2 ppm ammonia gases from each of the up to thirty well pad sand separators up to twice per each eight-hour shift. Conservatively assuming that half (fifteen) of the thirty well pad separators would discharge during the same hour, the hourly potential to emit for H₂S is as shown in Table 3. With six hourly discharges per day, 365 days per year, the daily and annual potential to emit are as shown in Table 4 and Table 5, respectively (see also APPENDIX A).

Table 3: Balance of Power Plant Hourly Potential to Emit

Emission Source	Potential to Emit (lbs/hr)				
	H2S	PM10	ROC	C6H6	NH3
Sand Separators	0.10	0.00	0.23	0.23	7.64
NCG Pipeline Condensate Drains	0.00	0.00	0.00	0.00	0.03
North Cooling Tower	0.00	1.10	0.00	0.00	0.00
South Cooling Tower	0.00	1.10	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	87.04	0.00	0.00

Table 4: Balance of Power Plant Daily Potential to Emit

Emission Source	Potential to Emit (lbs/day)				
	H2S	PM10	ROC	C6H6	NH3
Sand Separators	0.62	0.00	1.39	1.39	45.84
NCG Pipeline Condensate Drains	0.01	0.00	0.02	0.02	0.73
North Cooling Tower	0.00	26.39	0.00	0.00	0.00
South Cooling Tower	0.00	26.39	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	136.00	0.00	0.00

Table 5: Balance of Power Plant Annual Potential to Emit

Emission Source	Potential to Emit (tons/yr)				
	H2S	PM10	ROC	C6H6	NH3
Sand Separators	0.11	0.00	0.25	0.25	8.37
NCG Pipeline Condensate Drains	0.00	0.00	0.00	0.00	0.13
North Cooling Tower	0.00	4.82	0.00	0.00	0.00
South Cooling Tower	0.00	4.82	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	24.82	0.00	0.00

Noncondensable Gas Condensate Drains

The Project would also release up to 144 gallons of condensate each hour from the noncondensable gas pipeline drains containing up to 2.9 ppm of hydrogen sulfide, 6.5 ppm

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benzene and 212.2 ppm ammonia gases. The hourly, daily and annual potential to emit from these noncondensable gas condensate drains are as shown in Table 3, Table 4 and Table 5, respectively (see also APPENDIX A).

Isopentane Sources

Each OEC Unit would have minor leaks of ROCs (isopentane) from the valves, connections, seals, and tubes which would be released either to the atmosphere or into the geothermal fluid or circulating cooling water lines. Isopentane would also be discharged to the atmosphere through the OEC VRUs, and during OEC Unit maintenance activities through the Maintenance VRU and opening sections of the OEC VRUs for maintenance. Experience with the most recent generation of OEC Units indicates that about one-third of the isopentane is discharged through fugitive emissions, and two-thirds from maintenance activities. Very little isopentane is discharged to the atmosphere through the OEC VRUs. Based on the results of quarterly inventories of isopentane in storage at other projects, Table 3, Table 4 and Table 5 provide the estimated hourly, daily and annual potential to emit isopentane, respectively (see also APPENDIX A).

Project operators would frequently inspect and monitor the OEC Units for isopentane leaks and visual signs of fugitive isopentane emissions. Ormat would also keep a record of valves, connections, seals, and tubes replaced to reduce pentane fugitive emissions.

Cooling Towers

The two Project cooling towers would each circulate up to 110,000 gallons of cooling water per minute containing up to 4,000 ppm by weight of total dissolved solids (TDS). High efficiency cooling tower drift eliminators would limit the drift rate to 0.0005 percent of the circulating cooling water rate. Conservatively assuming that all of the aerosols which form when the emitted cooling tower drift evaporated are PM10 or smaller, then the hourly PM10 potential to emit for each cooling tower is as shown in Table 3. With each cooling tower assumed to operate 24 hours per day, 365 days per year, the daily and hourly PM10 potential to emit are as listed in Table 4 and Table 5, respectively (see also APPENDIX A).

Emergency Standby Diesel Engine-Generator

The 535 kW emergency standby diesel engine-generator would meet the applicable California Air Resources Board (CARB) Tier 3 stationary compression ignition engine exhaust emission standards of NMHC+NO_x = 4.0, CO = 3.5 and PM = 0.20 grams per kilowatt-hour.

The engine would also comply with the CARB "Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines" for new stationary emergency standby diesel-fueled compression ignition engines >50 bhp (PM₁₀ ≤ 0.15 g/bhp-hr). As required by the ATCM, this diesel engine would also burn CARB diesel fuel (≤15 ppm sulfur). In compliance with the ATCM, this diesel engine would be tested for a total of less than 50 hours per year (for up to one hour per day). Other than for testing, this engine would operate only in emergencies.

Table 6, Table 7 and Table 8 provide the calculated hourly, daily and annual potential to emit, respectively, for this engine for the criteria air pollutants PM₁₀, NO_x, CO and SO₂, and for the

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criteria air pollutant precursor ROC, assuming that the engine is tested for no more than one hour per day. Table 9 provides the summary of the calculated annual HAP emissions for this engine.

Table 6: Diesel Engine Hourly Potential to Emit

Emission Source	Potential to Emit (lbs/hr)				
	PM10	ROC	CO	NOx	SO2
East Brawley Geothermal Development Project					
Emergency Standby Diesel Fire-Water Pump	0.043	0.066	0.284	2.545	0.003
Emergency Standby Diesel Generator	0.236	0.120	4.126	4.595	0.009
Project Total:	0.278	0.186	4.410	7.140	0.012

Table 7: Diesel Engine Daily Potential to Emit

Emission Source	Potential to Emit (lbs/day)				
	PM10	ROC	CO	NOx	SO2
East Brawley Geothermal Development Project					
Emergency Standby Diesel Fire-Water Pump	0.043	0.066	0.284	2.545	0.003
Emergency Standby Diesel Generator	0.236	0.120	4.126	4.595	0.009
Project Total:	0.278	0.186	4.410	7.140	0.012

Table 8: Diesel Engine Annual Potential to Emit

Emission Source	Potential to Emit (tons/yr)				
	PM10	ROC	CO	NOx	SO2
East Brawley Geothermal Development Project					
Emergency Standby Diesel Fire-Water Pump	0.0011	0.0017	0.0071	0.0636	0.0001
Emergency Standby Diesel Generator	0.0059	0.0030	0.1031	0.1149	0.0002
Project Total:	0.0070	0.0047	0.1102	0.1785	0.0003

Table 9: Hazardous Air Pollutant Potential to Emit by Emission Unit

Emission Source	Hazardous Air Pollutant Emissions (tons/yr)		
	Diesel HAPs	C6H6	Totals
Noncondensable Gas Scrubbing System	0.00000	2.45280	2.45280
Sand Separators	0.00000	0.25435	0.25435
NCG Pipeline Condensate Drains	0.00000	0.00407	0.00407
North Cooling Tower	0.00000	0.00000	0.00000
South Cooling Tower	0.00000	0.00000	0.00000
OEC Isopentane Emissions	0.00000	0.00000	0.00000
Emergency Standby Diesel Fire-Water Pump	0.00184	0.00000	0.00184
Emergency Standby Diesel Generator	0.01015	0.00000	0.01015
Totals:	0.01199	2.71122	2.72321

Emergency Standby Diesel Fire Pump Engine

Based on manufacturer’s certifications, the 215 kW emergency standby diesel fire pump engine would emit less than the applicable CARB Tier 2 stationary compression ignition engine exhaust emission standards of NMHC+NO_x = 6.6, CO = 3.5 and PM = 0.20 grams per kilowatt-hour.

The engine would also comply with the CARB “Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines” for new stationary emergency standby diesel-fueled compression ignition engines >50 bhp (PM₁₀ ≤ 0.15 g/bhp-hr). As required by the ATCM, this diesel engine would also burn CARB diesel fuel (≤15 ppm sulfur). In compliance with the ATCM, this diesel engine would be tested for a total of less than 50 hours per year (for up to one hour per day). Other than for testing, this engine would operate only in emergencies.

Table 6, Table 7 and Table 8 provide the calculated hourly, daily and annual potential to emit, respectively, for this engine for the criteria air pollutants PM₁₀, NO_x, CO and SO₂, and for the criteria air pollutant precursor ROC, assuming that the engine is tested for no more than one hour per day. Table 9 provides the summary of the calculated annual HAP emissions for this engine.

Summary of Facility Calculated Potential to Emit

Table 10 provides a summary of the Facility potential to emit air pollutants and air pollutant precursors. Table 11 provides a summary of the Facility abated emissions of these air pollutants and air pollutant precursors. Table 9 provides a summary of the calculated annual HAP emissions for each emission unit.

Table 10: Summary of Facility Potential to Emit

Description	Facility Potential to Emit							
	PM10	SO2	CO	NO _x	ROC	H2S	NH3	C6H6
Hourly PTE (lbs):	2.48	0.0122	4.41	7.14	98.66	2.24	22.27	11.43
Daily PTE (lbs):	53.06	0.0122	4.41	7.14	406.40	51.96	396.86	270.22
Annual PTE (tons):	9.64	0.0003	0.11	0.18	74.13	9.48	72.43	49.31

Table 11: Summary of Facility Abated Emissions

Description	Facility Abated Emissions							
	PM10	SO2	CO	NO _x	ROC	H2S	NH3	C6H6
Hourly PTE (lbs):	2.48	0.0122	4.41	7.14	88.02	0.53	7.67	0.79
Daily PTE (lbs):	53.06	0.0122	4.41	7.14	151.04	10.90	46.58	14.86
Annual PTE (tons):	9.64	0.0003	0.11	0.18	27.53	1.99	8.50	2.71

POTENTIAL EMISSIONS FROM CONSTRUCTION AND WELL FIELD START-UP ACTIVITIES

Grading and Site Construction

Construction of the power plant, new access roads and pipelines would produce fugitive dust from site grading and other construction-related surface disturbing activities. Construction of the power plant would directly disturb about 15 acres of land, and another 10 acres would be disturbed for the adjacent equipment laydown and fabrication yard (although the equipment laydown and fabrication yard would be reclaimed following the completion of construction). All surface-disturbing activities would implement appropriate techniques to comply with ICAPCD Regulation VIII to apply BACT to limit dust emissions. These would include watering the construction area at least twice a day; increasing watering frequency when winds exceed 15 mph; limiting vehicular speed to 15 mph on dirt roads and areas; and using gravel ramps at road entrances.

Existing access roads (paved, graveled or dirt) would be utilized to the extent practical. Any new access required for the Project would be constructed adjacent to the edges of the agricultural fields and parallel to irrigation canals and drains that traverse the Project area. Approximately 14 miles of pipeline would be built, but no new roads would be built for pipeline construction or maintenance and pipeline construction would not require grading of the pipeline routes.

Well Field Start-Up

Geothermal injection wells which are shut in for a period of time may develop a small cap of geothermal noncondensable gases in the well bore above the standing geothermal fluid as these gases are slowly released from the geothermal fluid. The relative proportions of these gases would generally resemble that in the produced geothermal noncondensable gas stream - approximately 99.95 percent carbon dioxide, methane and nitrogen, with the remainder consisting principally of C_6H_6 , H_2S and ammonia.

Prior to placing any injection well into, or back into, service, these geothermal noncondensable gases capping the geothermal fluid would be discharged unabated to the atmosphere through a stack on the well site.

COMPLIANCE WITH APPLICABLE REGULATIONS

Rule 201 Permits Required

The Project is a new Facility that will emit air contaminants and thus requires an Authority to Construct from the ICAPCD.

Rule 206 Processing of Applications

Rule 206.A.4.c provides that the Air Pollution Control Officer shall take reasonable steps to insure that no Project will emit air contaminants that may endanger the short or long term health, safety or property of Persons. Attached as APPENDIX C is an assessment of the potential health risks of the benzene and hydrogen sulfide emissions from the noncondensable gas scrubber vent stack. This assessment demonstrates that the Project would not emit benzene or hydrogen sulfide that would endanger the long-term health of nearby sensitive receptors.

Rule 207 New and Modified Stationary Source Review

Rule 207.C.1.a requires Best Available Control Technology (BACT) for equipment with the potential to emit 25 pounds per day or more of any nonattainment pollutant or its precursors.

The PM10 potential to emit from each cooling tower would exceed 25 lbs/day (see Table 4), and will require BACT, in the form of high efficiency drift eliminators capable of controlling cooling tower drift to 0.0005 percent or less of the circulating cooling water.

Each OEC Unit has the potential to emit more than 25 lbs/day of ROCs (isopentane) from major maintenance activities and will require BACT. For each OEC Unit, BACT is use of the Maintenance VRU during OEC Unit maintenance activities. In addition, the use of OEC VRUs on each OEC Unit condenser and frequent inspection, monitoring and maintenance of each OEC Unit limits isopentane emissions.

The well pad high pressure separators have the potential to emit ROCs (benzene) in excess of 25 lbs/day and will require BACT. Seventy-five percent or more of the noncondensable gases (including benzene) separated by the high pressure separators will be dissolved/entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. None of these gases will be emitted to the atmosphere. The other twenty-five percent or less of these separated geothermal noncondensable gases would flow through dedicated pipelines to the geothermal noncondensable gas scrubbing system located at the power plant site. This scrubbing system is considered BACT for the ROCs in this noncondensable gas stream as it will remove a minimum of 95 percent of the benzene in this gas stream. The resulting benzene emissions would be 13.44 lbs/day (see Table 2).

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Rule 207.C.1.c requires Best Available Control Technology (BACT) for equipment with the potential to emit 55 pounds per day or more of hydrogen sulfide. All of the well pad high pressure separators together have the potential to emit 51.32 lbs/day of hydrogen sulfide during operations, which does not exceed 55 lbs/day. However, the geothermal noncondensable gas scrubbing system located at the power plant site will remove about 80 percent of the hydrogen sulfide in this gas stream, resulting in hydrogen sulfide emissions from this system of about 10.26 lbs/day (see Table 4).

Best Available Control Technology would not be required for any other emission unit.

Rule 207.C.2.a requires offsets for all emissions of ROCs, PM10 and other nonattainment pollutants from a source that exceed 137 pounds per day. The power plant would emit ROCs in excess of 137 pounds per day, so offsets will be required for the Facility. With ROCs emissions of 151.04 lbs/day (see Table 11), the Facility would require offsets (at a ratio of 1.2 to 1) for 16.8 lbs/day, or 0.77 tons/quarter.

Offsets would not be required for any other attainment or nonattainment air pollutant, and Rule 207.C.f allows the Air Pollution Control Officer to exempt the two emergency engines from the offset requirements of Rule 207.C.2.

Rule 208 Permit to Operate

The ICAPCD may inspect and evaluate the new equipment prior to allowing the project to operate under its Permit to Operate. The Project would be available to the ICAPCD for inspection once it is constructed and commences operation.

Rule 216 Construction or Reconstruction of Major Stationary Sources that Emit Hazardous Air Pollutants

Rule 216 requires stationary sources of hazardous air pollutants to install best available control technology for toxics (T-BACT) on any constructed major source.

The well pad high pressure separators have the potential to emit benzene in excess of 10 tons/yr and will require T-BACT. Seventy-five percent or more of the benzene separated by the high pressure separators will be dissolved/entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. None of this benzene will be emitted to the atmosphere. The other twenty-five percent or less of the benzene in the separated geothermal noncondensable gases would flow through dedicated pipelines to the geothermal noncondensable gas scrubbing system located at the power plant site. This scrubbing system is considered T-BACT for the benzene in this noncondensable gas stream as it will remove a minimum of 95 percent of the benzene in this gas stream. The resulting benzene emissions would be 13.44 lbs/day (see Table 2).

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Rule 400 Fuel Burning Equipment – Oxides of Nitrogen

Each of the emergency standby diesel engines would emit less than 5 lb/hour of NO_x (see Table 6), far less than the standard of 140 lb/hour of NO_x. They would each also operate less than 50 hours per 12 month period and emit far less than the annual 5 tons of NO_x standard (see Table 8).

Rule 401 Opacity of Emissions

The cooling tower water vapor emissions are exempted from the requirements of Rule 401. The emissions of particulates from each of the emergency standby diesel engines would be in compliance with the California diesel particulate ATCM, and thus have an opacity substantially lighter than the No. 1 on the Ringlemann Chart (20% opacity) required by Rule 401.

Rule 403 General Limitations on the Discharge of Air Contaminants

Rule 403 prohibits emission of particulate matter in excess of the emission rates in Table 403-1. The weight of the cooling water circulating through each cooling tower is about 55,000,000 lbs/hr. In Table 403-1, the maximum discharge of particulate matter for any process that handles more than 1,000,000 lbs/hr is 30.0 lbs/hr. The particulate potential to emit from each cooling tower would be less than 30.0 lbs/day (see Table 4).

Rule 403 also prohibits emission of air contaminants in excess of the rates in Table 403-2. The dry volume of gas (air) flowing through each cell of each cooling tower is estimated at 1,300,000 dry standard cubic feet per minute (dscfm), or about 13,000,000 dscfm for each cooling tower. In Table 403-2, the maximum concentration of particulate matter in the discharge of any process that handles more than 2,472,000 dscfm is 0.0100 grains/dscf. The concentration of particulate matter in each cooling tower is calculated at less than 0.00002 gr/dscf (see Table 12).

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Table 12: Calculation of Maximum Concentrations of Air Contaminants

Description	Maximum Concentration of Air Contaminants			
	PM	PM10	H2S	H2S
Cooling Tower emissions (lbs/hr):	2.199	2.199		
Scrubber emissions (lbs/hr):			0.428	
Sand separators emissions (lbs/hr):				0.090
Cooling Tower emissions (grains/min):	256.6	256.6		
Cooling Tower dscfm:	13,000,000	13,000,000		
Cooling Tower Air Contaminant Concentrations (grains/dscf):	0.0000197	0.0000197		
Concentration Limitation - Rule 403.B.2:	0.0100	0.0100		
(Exceeded?)	NO	NO		
Noncondensable Gases in Geothermal Brine (%):				1.5%
Mass of Noncondensable Gases Emitted (lbs/hr):			21,876.5	936.0
Molecular Weight of Air:			28.97	28.97
Molecular Weight of Carbon Dioxide:			44.01	44.01
CO2/air molecular mass ratio:			1.52	1.52
Density of Dry Air at STP (lbs/cu ft):			0.075	0.075
Density of Dry CO2 Gas at STP (lbs/cu ft):			0.114	0.114
Volume of Noncondensable Gases Emitted (cu ft/hr):			192,005.8	8,215.1
Molecular Weight of Hydrogen Sulfide:			34.08	34.08
Molecular Weight of Sulfur Dioxide:			64.06	64.06
SO2/H2S molecular mass ratio:			1.88	1.88
Sulfur Dioxide equivalent mass emission rate (lbs/hr):			0.80	0.17
Density of Dry SO2 Gas at STP (lbs/cu ft):			0.166	0.166
Volume of Sulfur Dioxide Equivalent Gases Emitted (cu ft/hr):			4.847	1.021
Sulfur Dioxide Concentration (%):			0.00252%	0.01243%
Sulfur Dioxide Concentration Limit (%) (Rule 405B.1.a):			0.20000%	0.20000%
(Exceeded?)			NO	NO

Rule 405 Sulfur Compounds Emission Standards, Limitations and Prohibitions

Rule 405B.1.a prohibits the discharge into the atmosphere of sulfur compounds, calculated as sulfur dioxide, in excess of 0.2 percent by volume, measured at the point of discharge. The maximum concentration of hydrogen sulfide, calculated as sulfur dioxide, in the geothermal noncondensable gases which would be discharged through the sand separators and condensate drains is 0.01243 percent by volume (see Table 12). The concentration of hydrogen sulfide, calculated as sulfur dioxide, in the scrubbed geothermal noncondensable gases which would be discharged through the scrubber system stack is 0.00252 percent by volume (see Table 12). Both are substantially below the limit of 0.2 percent by volume.

Rule 800-805 Fugitive Dust Requirements for Control of Fine Particulate Matter (PM10)

These rules control fugitive dust emissions from construction and earthmoving activities, from carry out and track out, from open areas, and paved and unpaved roads. If necessary, Ormat would revise its current dust control plan and provide 10-day advance notice to the ICAPCD. During construction Ormat would water disturbed lands to reduce dust emissions. After construction fugitive dust from open areas would be controlled through application and maintenance of water or

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dust suppressant(s) to all unvegetated areas, establishing vegetation on previously disturbed areas, or paving, applying and maintaining gravel, or applying and maintaining chemical stabilizers/suppressants.

Rule 900 Procedures for Issuing Permits to Operate for Sources Subject to Title V of the Federal Clean Air Act Amendments of 1990

The Facility does not have the potential to emit 100 tons per year (tpy) or more of any regulated air pollutant. The Facility would have the potential to emit 10 tpy or more of benzene, a hazardous air pollutant (HAP), except for the implementation of the geothermal noncondensable gas scrubber. If the Facility's request for synthetic minor source status is accepted by the District, the Facility would not be a major source subject to Rule 900.

Rule 902 - Request for Synthetic Minor Source Status

This rule authorizes the owners or operators of specified stationary sources that would otherwise be major sources (pursuant to Rule 900) to request and accept federally-enforceable emissions limits sufficient to allow the sources to be considered "synthetic minor sources." The Facility is submitting as part of this application a request for synthetic minor source status as the proposed implementation of the geothermal noncondensable gas scrubber would reduce the Facility's potential to emit benzene, a hazardous air pollutant (HAP), from in excess of 10 tpy to well under 10 tpy. These emission limitations would be set forth in permit conditions practicably enforceable by U.S. EPA and citizens or by the District.

Rule 1101 New Source Performance Standards (NSPS)

All of the stationary emergency engines proposed for the Facility would be new diesel engines, and therefore would be subject to the requirements of 40 CFR Part 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines). Ormat Nevada, Inc. will comply with the requirements of this NSPS by:

- Operating and maintaining the diesel engines according to the manufacturer's written instructions over the entire life of each engine;
- Using fuel which meets the minimum standards set forth in the regulations;
- Installing a non-resettable hour meter prior to startup of the engine;
- Limiting maintenance checks and readiness testing of each engine to less than 50 hours per year; and
- Keeping records of the operation of each engine in emergency and non-emergency service that are recorded through the non-resettable hour

East Brawley Geothermal Development Project -- Attachment 1
Application for Authority to Construct

meter, including recording the time of operation of each engine and the reason each engine was in operation during that time.

Rule 1002 California Airborne Toxic Control Measures (ATCMs)

Each of the two emergency standby diesel engines would meet the applicable CARB Tier stationary compression ignition engine exhaust emission standards and comply with the CARB "Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines" for new stationary emergency standby diesel-fueled compression ignition engines >50 bhp. In compliance with the ATCM, each of these diesel engines would be tested for a total of less than 50 hours per year (for up to one hour per day). Other than for testing, each emergency standby engine would operate only in emergencies. Each engine would also burn CARB diesel fuel (≤ 15 ppm sulfur).

Rule 1003 Hexavalent Chromium Emissions from Cooling Towers

The cooling towers would not use additives containing hexavalent chromium, and would thus be eligible for exemption from testing requirements.

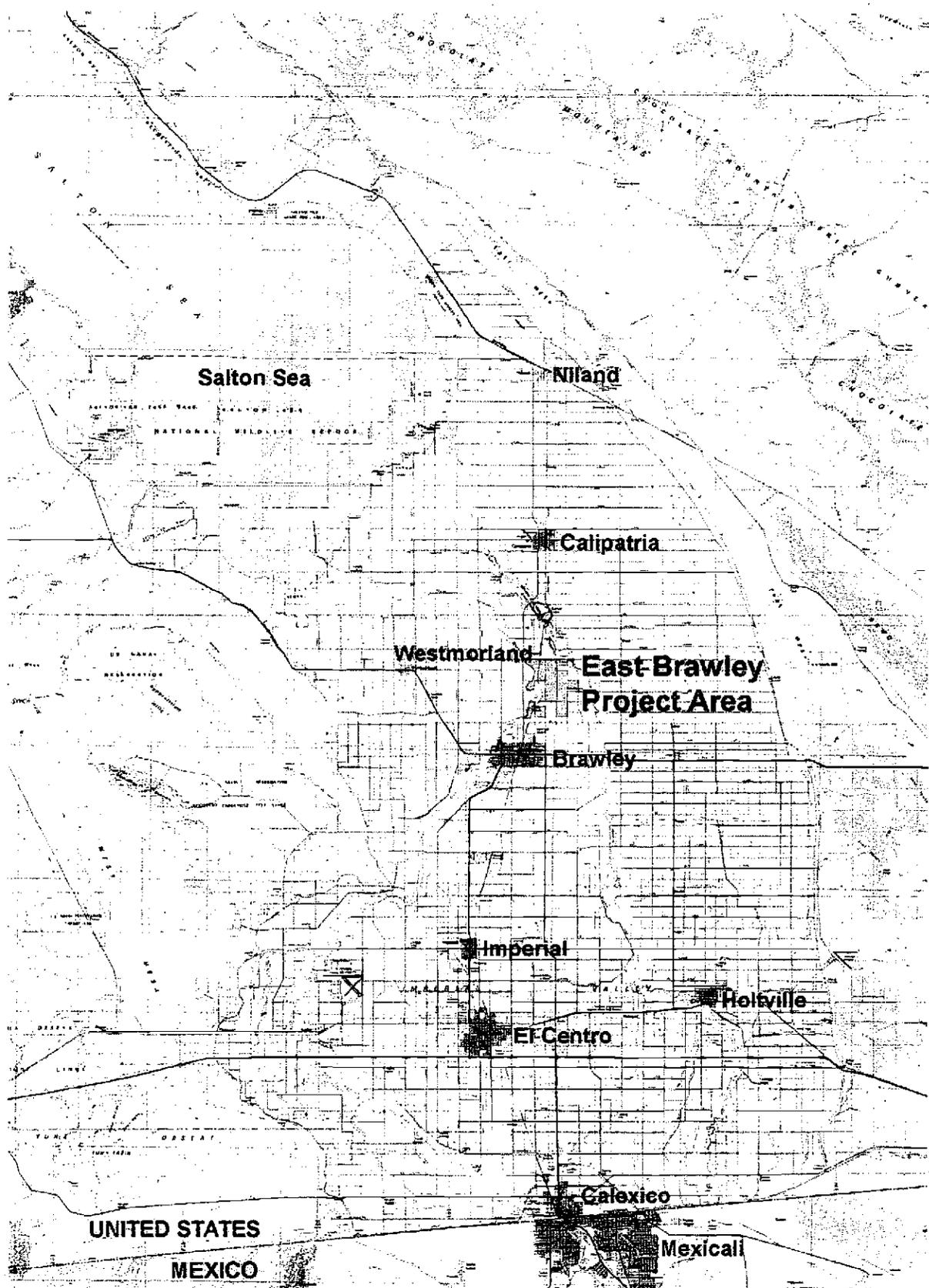


Figure 1: East Brawley Geothermal Development Project Location Map

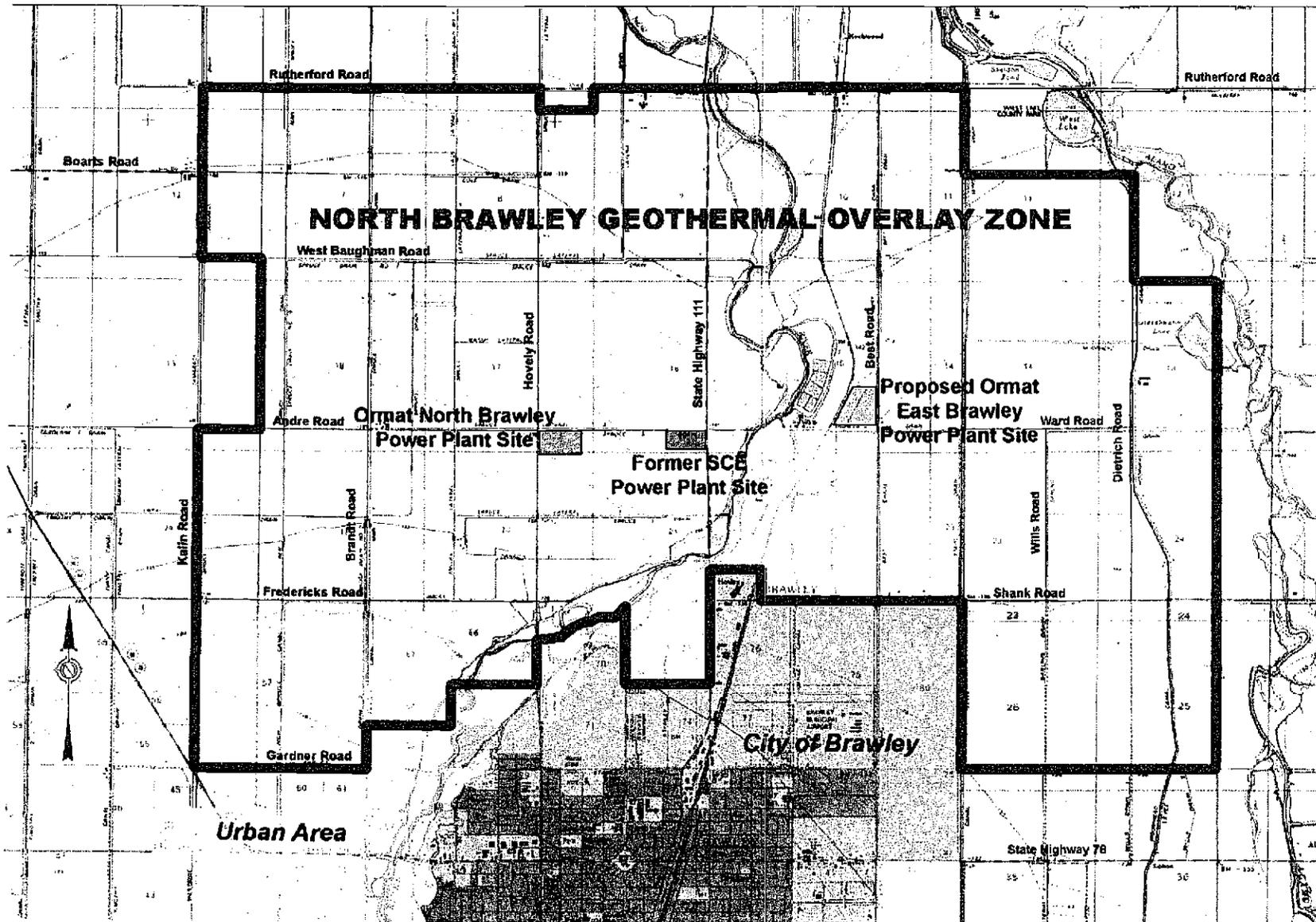


Figure 2: East Brawley Project Power Plant Location Map



- Approved Geothermal Exploration Well Site: ●
- Proposed Geothermal Development Well Site: ●
- Proposed Geothermal Pipeline Route: —+
- Proposed Freshwater Pipeline Route: —

Project Area Extents
Shown on the Figure:



TN* MN
12°

0 0.5 1.0
Miles

Figure 3: East Brawley Project Geothermal Wellfield

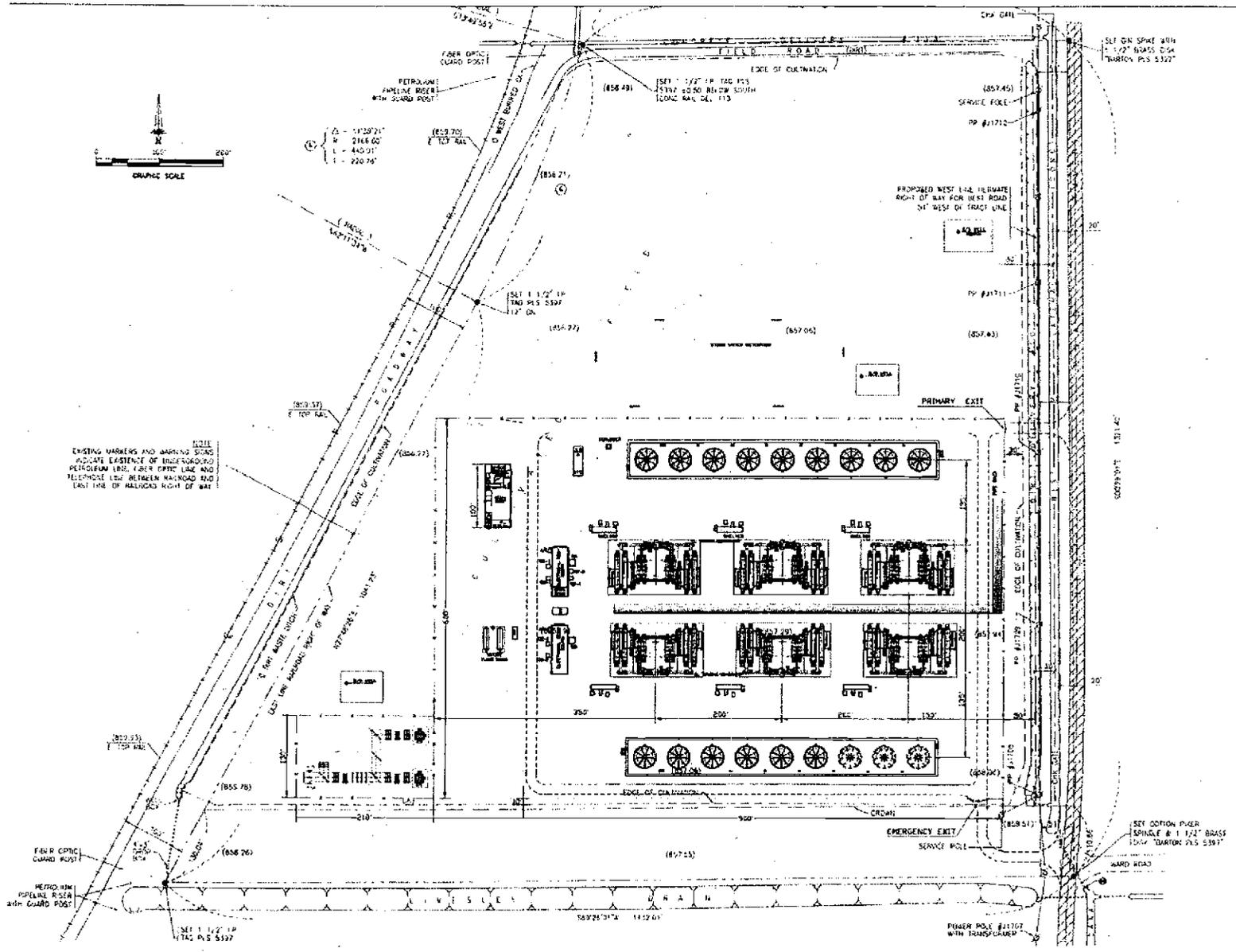


Figure 4: East Brawley Project Power Plant General Arrangement – Map View

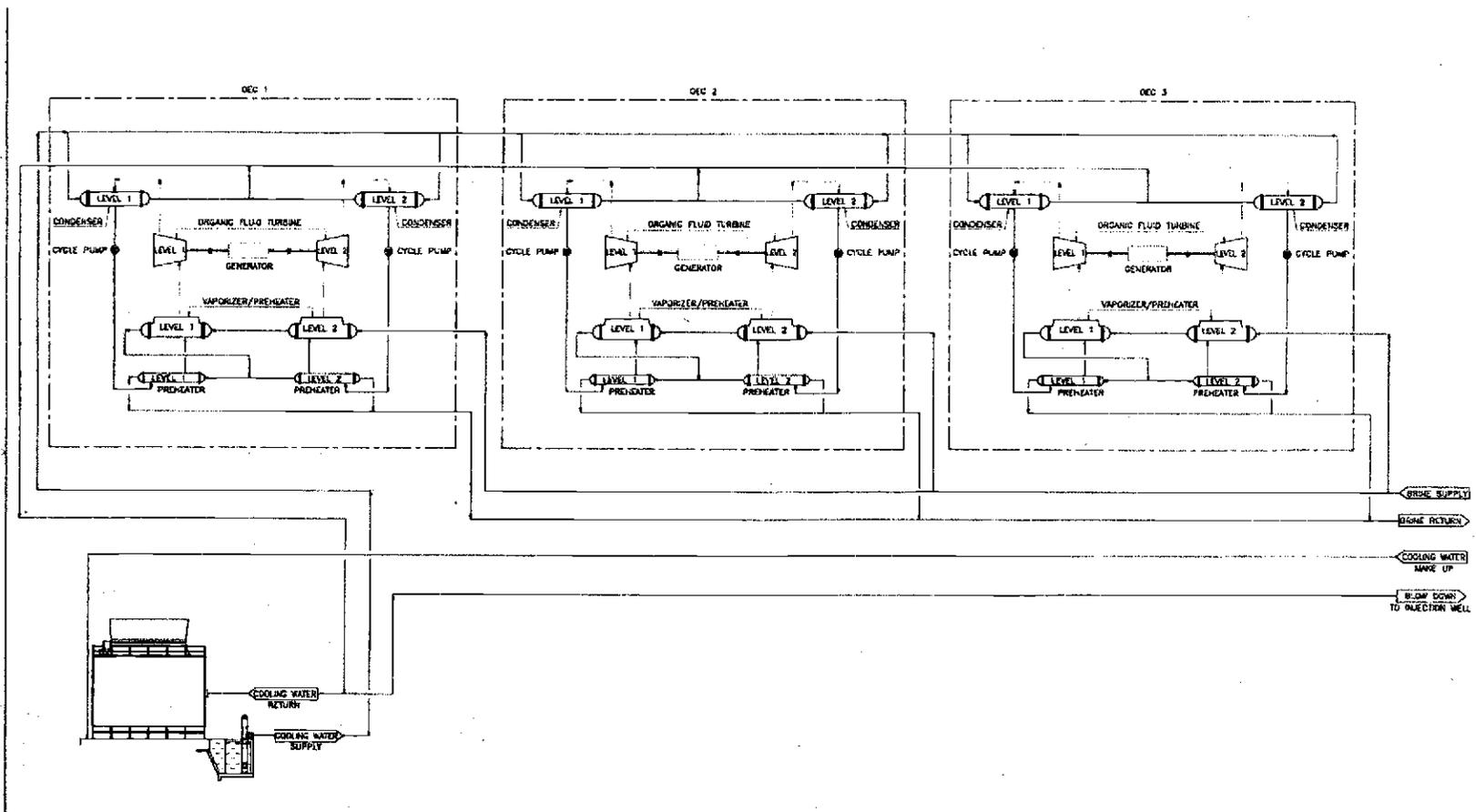


Figure 5: East Brawley Project Power Plant Basic Block Diagram (Sheet 1)

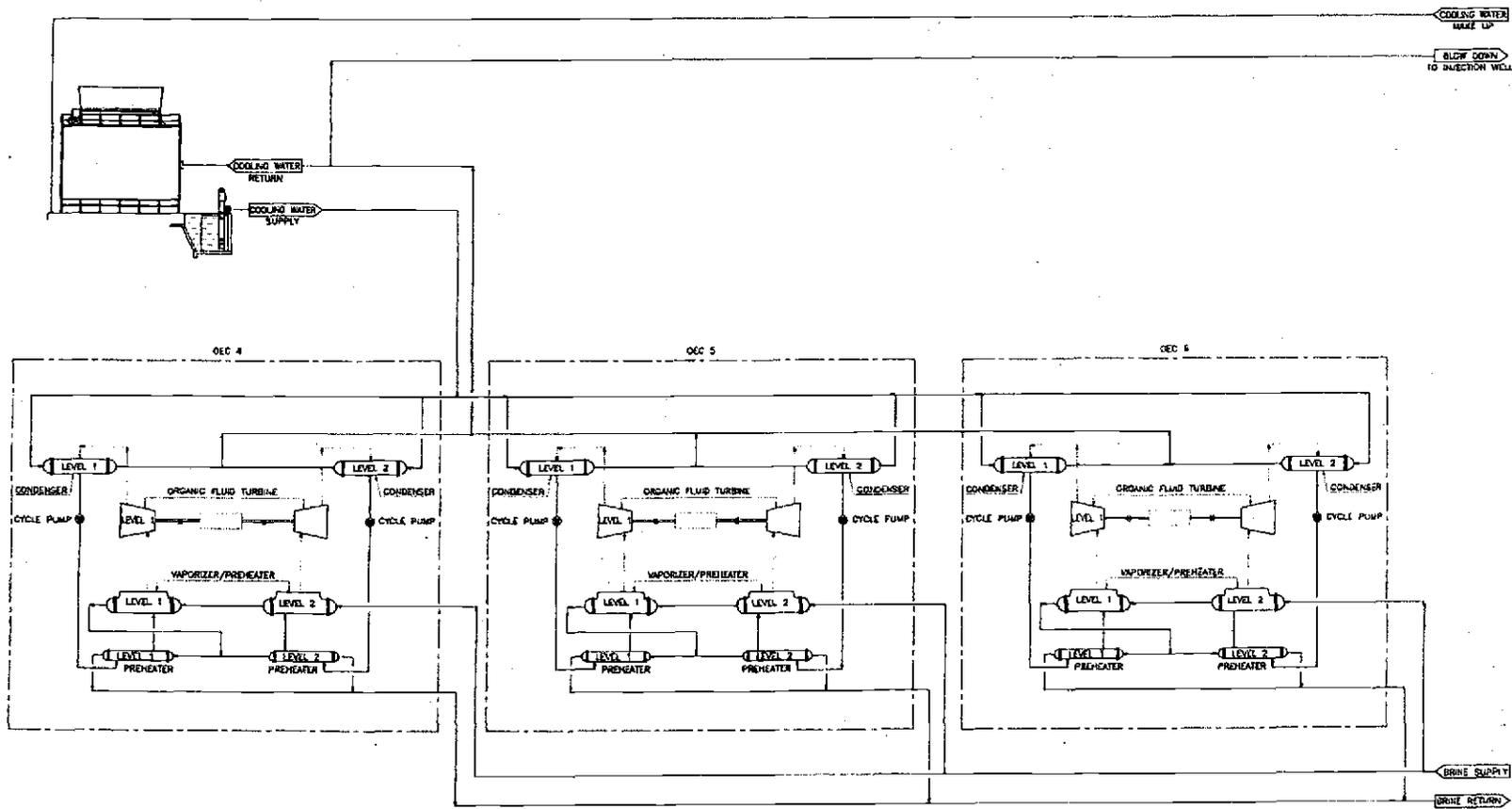


Figure 6: East Brawley Project Power Plant Basic Block Diagram (Sheet 2)

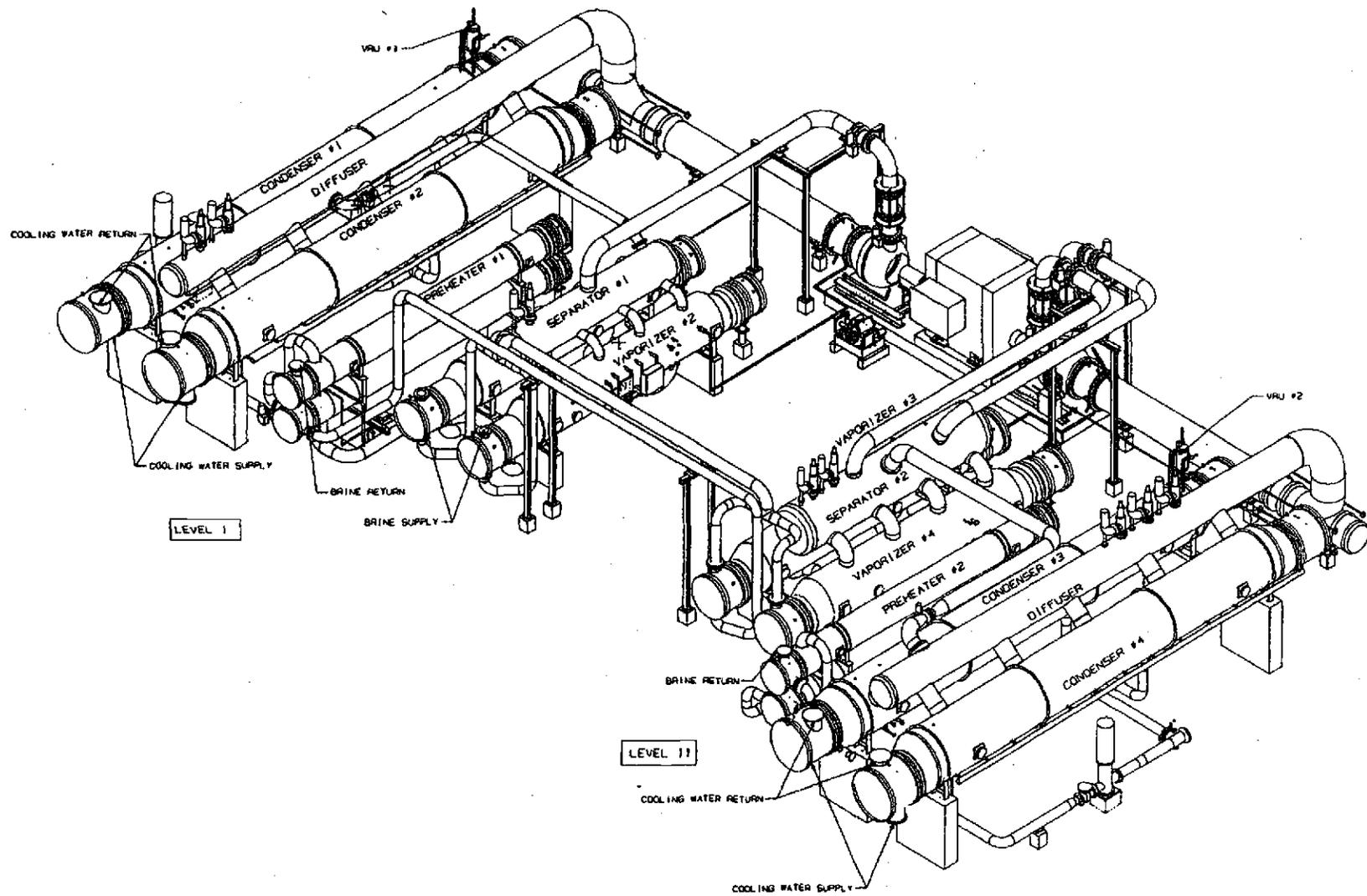
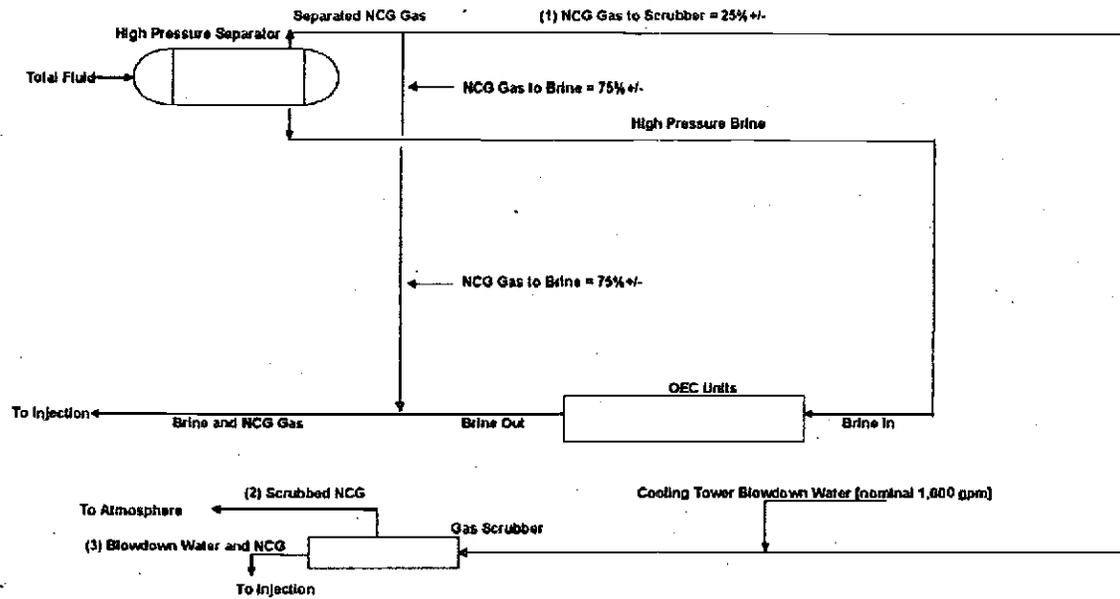


Figure 7: General Arrangement (Perspective View) of Single OEC Unit (One of Six)

Figure 8-Scrubber Flow Diagram



	(1)		(2)		(3)	
	NCG to Scrubber (ppm)	(lbs/hr)	NCG to Atmosphere (ppm)	(lbs/hr)	NCG to Injection (ppm)	(lbs/hr)
H ₂ S	43.50	2.14	19.55	0.43		1.71
C ₆ H ₆	398.70	11.20	25.60	0.56		10.64
NH ₃	14.60	0.41	0.00	0.00		0.41
Other NCG	899,543.20	28,091.31	999,954.85	21,876.53		6,202.02

Figure 8: East Brawley Geothermal Noncondensable Gas Scrubber Process Flow Diagram

**APPENDIX A – DETAILED CALCULATIONS FOR THE FACILITY AND EMISSION UNIT
POTENTIALS TO EMIT**

APPENDIX A - PLANT SOURCES

POTENTIAL TO EMIT	EAST BRAWLEY GEOTHERMAL PROJECT PLANT SOURCES										
Emission Source	Throughput				Daily Hours	Annual Hours	Emission Factors (lb/unit)				
	Hourly	Daily	Annually	Units			H2S	PM10	ROC	C6H6	NH3
Noncondensable Gas Scrubbing System	28,091	674,191	246,079,876	lbs	24	8,760	0.000076		0.000399	0.000399	0.000520
Sand Separators	36,000	216,000	78,840,000	lbs	6	2,190	0.000003		0.000006	0.000006	0.000212
NCG Pipeline Condensate Drains	144	3,456	1,261,440	lbs	24	8,760	0.000003		0.000006	0.000006	0.000212
North Cooling Tower	27,489	659,736	240,803,640	tons	24	8,760		0.000040			
South Cooling Tower	27,489	659,736	240,803,640	tons	24	8,760		0.000040			
DEC Isopentane Emissions					24	8,760					
Plant Source Total:											

ABATED EMISSIONS	EAST BRAWLEY GEOTHERMAL PROJECT PLANT SOURCES										
Emission Source	Throughput				Daily Hours	Annual Hours	Emission Factors (lb/unit)				
	Hourly	Daily	Annually	Units			H2S	PM10	ROC	C6H6	NH3
Noncondensable Gas Scrubbing System	21,877	525,037	191,638,403	lbs	24	8,760	0.000020		0.000026	0.000026	0.000000
Sand Separators	36,000	216,000	78,840,000	lbs	6	2,190	0.000003		0.000006	0.000006	0.000212
NCG Pipeline Condensate Drains	144	3,456	1,261,440	lbs	24	8,760	0.000003		0.000006	0.000006	0.000212
North Cooling Tower	27,489	659,736	240,803,640	tons	24	8,760		0.000040			
South Cooling Tower	27,489	659,736	240,803,640	tons	24	8,760		0.000040			
DEC Isopentane Emissions					24	8,760					
Plant Source Total:											

APPENDIX A - PLANT SOURCES

POTENTIAL TO EMIT		EAST BRAWLEY GEOTHERMAL PROJECT PLANT SOURCES														
Emission Source	Potential to Emit (lbs/hr)					Potential to Emit (lbs/day)					Potential to Emit (tons/yr)					
	H2S	PM10	ROC	C6H6	NH3	H2S	PM10	ROC	C6H6	NH3	H2S	PM10	ROC	C6H6	NH3	
Noncondensable Gas Scrubbing System	2.14	0.00	11.20	11.20	14.60	51.32	0.00	268.80	268.80	350.29	9.37	0.00	49.06	49.06	63.93	
Sand Separators	0.10	0.00	0.23	0.23	7.64	0.62	0.00	1.39	1.39	45.84	0.11	0.00	0.25	0.25	8.37	
NCG Pipeline Condensate Drains	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.02	0.02	0.73	0.00	0.00	0.00	0.00	0.13	
North Cooling Tower	0.00	1.10	0.00	0.00	0.00	0.00	26.39	0.00	0.00	0.00	0.00	4.82	0.00	0.00	0.00	
South Cooling Tower	0.00	1.10	0.00	0.00	0.00	0.00	26.39	0.00	0.00	0.00	0.00	4.82	0.00	0.00	0.00	
OEC Isopentane Emissions	0.00	0.00	87.04	0.00	0.00	0.00	0.00	136.00	0.00	0.00	0.00	0.00	24.82	0.00	0.00	
Plant Source Total:	2.24	2.20	98.47	11.43	22.27	51.96	52.78	406.22	270.22	396.86	9.48	9.63	74.13	49.31	72.43	

ABATED EMISSIONS		EAST BRAWLEY GEOTHERMAL PROJECT PLANT SOURCES														
Emission Source	Abated Emissions (lbs/hr)					Abated Emissions (lbs/day)					Abated Emissions (tons/yr)					
	H2S	PM10	ROC	C6H6	NH3	H2S	PM10	ROC	C6H6	NH3	H2S	PM10	ROC	C6H6	NH3	
Noncondensable Gas Scrubbing System	0.43	0.00	0.56	0.56	0.00	10.26	0.00	13.44	13.44	0.00	1.87	0.00	2.45	2.45	0.00	
Sand Separators	0.10	0.00	0.23	0.23	7.64	0.62	0.00	1.39	1.39	45.84	0.11	0.00	0.25	0.25	8.37	
NCG Pipeline Condensate Drains	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.02	0.02	0.73	0.00	0.00	0.00	0.00	0.13	
North Cooling Tower	0.00	1.10	0.00	0.00	0.00	0.00	26.39	0.00	0.00	0.00	0.00	4.82	0.00	0.00	0.00	
South Cooling Tower	0.00	1.10	0.00	0.00	0.00	0.00	26.39	0.00	0.00	0.00	0.00	4.82	0.00	0.00	0.00	
OEC Isopentane Emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	
Plant Source Total:	0.53	2.20	0.79	0.79	7.67	10.90	52.78	14.86	14.86	46.58	1.99	9.63	2.78	2.71	8.50	

APPENDIX A - COMBUSTION SOURCES

POTENTIAL TO EMIT	EAST BRAWLEY GEOTHERMAL PROJECT COMBUSTION SOURCES										
Emission Source	Throughput				Daily Hours	Annual Hours	Emission Factors (lb/unit)				
	Hourly	Daily	Annually	Units			PM10	ROC	CO	NO _x	SO ₂
Emergency Standby Diesel Fire-Water Pump	215	215	10,750	kw-hr	1	50	0.000198	0.000309	0.001323	0.011839	0.000016
Emergency Standby Diesel Generator	535	535	26,733	kw-hr	1	50	0.000441	0.000224	0.007716	0.008594	0.000016
Combustion Source Total:											

APPENDIX A - COMBUSTION SOURCES

POTENTIAL TO EMIT		EAST BRAWLEY GEOTHERMAL PROJECT COMBUSTION SOURCES														
Emission Source	Potential to Emit (lbs/hr)					Potential to Emit (lbs/day)					Potential to Emit (tons/yr)					
	PM10	ROC	CO	NOx	SO2	PM10	ROC	CO	NOx	SO2	PM10	ROC	CO	NOx	SO2	
Emergency Standby Diesel Fire-Water Pump	0.043	0.066	0.284	2.545	0.003	0.043	0.066	0.284	2.545	0.003	0.0011	0.0017	0.0071	0.0636	0.0001	
Emergency Standby Diesel Generator	0.236	0.120	4.126	4.595	0.009	0.236	0.120	4.126	4.595	0.009	0.0059	0.0030	0.1031	0.1149	0.0002	
Combustion Source Total:	0.278	0.186	4.410	7.140	0.012	0.278	0.186	4.410	7.140	0.012	0.0070	0.0047	0.1102	0.1785	0.0003	

APPENDIX A - SOURCE NOTES

EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT - POTENTIAL TO EMIT NOTES

Noncondensable Gas Scrubbing System

(Source: Engineering Estimates)

Total noncondensable gas into scrubber	28,091.3 lbs/hr
Assumed factor of safety	1.00
Total noncondensable gas into scrubber with factor of safety	28,091.3 lbs/hr
Total scrubbed noncondensable gas discharged to atmosphere	21,876.5 lbs/hr
Assumed factor of safety	1.00
Total scrubbed noncondensable gas discharged to atmosphere with factor of safety	21,876.5 lbs/hr
Nominal concentration of Hydrogen Sulfide (H ₂ S) in noncondensable gases to scrubber	43.5 ppmw
Assumed factor of safety for H ₂ S into scrubber	1.75
Mass of H ₂ S in noncondensable gases to scrubber with assumed factor of safety	2.14 lbs/hr
H ₂ S Emission Factor (PTE) = EF _{H₂S}	0.000076 lbs/lb
H ₂ S control [scrub with water (cooling tower blowdown)]	80.0%
Mass of H ₂ S in scrubbed noncondensable gases discharge to atmosphere	0.43 lbs/hr
Assumed factor of safety for concentration of gases out of scrubber	1.00
Concentration of H ₂ S in scrubbed noncondensable gases discharge to atmosphere	19.55 ppmw
H ₂ S Emission Factor (Abated) = EF _{H₂S}	0.000020 lbs/lb
Mass of H ₂ S in scrubber liquid injected to the geothermal reservoir	1.71 lbs/hr
Nominal concentration of Benzene (C ₆ H ₆) in noncondensable gases to scrubber	398.7 ppmw
Mass of C ₆ H ₆ in noncondensable gases to scrubber with assumed factor of safety	11.20 lbs/hr
C ₆ H ₆ Emission Factor (PTE) = EF _{C₆H₆}	0.000399 lbs/lb
C ₆ H ₆ control [scrub with water (cooling tower blowdown) by entrainment and solution for injection]	95.0%
Mass of C ₆ H ₆ in scrubbed noncondensable gases discharge to atmosphere	0.56 lbs/hr
Concentration of C ₆ H ₆ in scrubbed noncondensable gases discharge to atmosphere	25.6 ppmw
C ₆ H ₆ Emission Factor (Abated) = EF _{C₆H₆}	0.000026 lbs/lb
Mass of C ₆ H ₆ in scrubber liquid injected to the geothermal reservoir	10.64 lbs/hr
Assumed factor of safety	1.00
Nominal concentration of Ammonia (NH ₃) in noncondensable gases to scrubber	14.6 ppmw
Mass of NH ₃ in noncondensable gases to scrubber with assumed factor of safety	0.4 lbs/hr
NH ₃ Emission Factor (PTE) = EF _{NH₃}	0.000520 lbs/lb
NH ₃ control [scrub with water (cooling tower blowdown) by entrainment and solution for injection]	100.0%
Mass of NH ₃ in scrubbed noncondensable gases discharge to atmosphere	0.0 lbs/hr
Concentration of NH ₃ in scrubbed noncondensable gases discharge to atmosphere	0.0 ppmw
NH ₃ Emission Factor (Abated) = EF _{NH₃}	0.000000 lbs/lb
Mass of NH ₃ in scrubber liquid injected to the geothermal reservoir	0.4 lbs/hr
Assumed factor of safety	1.00
Nominal concentration of other noncondensable gases (CO ₂ , N ₂ , CH ₄) to scrubber	999,543.2 ppmw
Nominal concentration of other noncondensable gases (CO ₂ , N ₂ , CH ₄) in scrubbed gases discharged to atmosphere	999,954.9 ppmw

APPENDIX A - SOURCE NOTES

EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT - POTENTIAL TO EMIT NOTES

Sand Separators

Number of sand separators	30	
Blowdowns per sand separator per shift	2	
Geothermal fluid discharged per sand separator blowdown	300 gal	
Geothermal fluid density (200°F)	8.00 lbs/gal	
Geothermal fluid discharged per sand separator blowdown	2,400 lbs	
Sand separator blowdowns per hour (assumes one-half of total sand separators)	15	
Geothermal fluid discharged per hour (assume all discharge in same hour)	36,000 lbs	
Geothermal fluid discharged per shift (assume discharge per one hour)	144,000 lbs/hr	
Hours per shift	8	
Geothermal fluid discharged from sand separators per day	432,000 lbs/day	54000 gals/day

(Source: Engineering Estimates)

Concentration of Hydrogen Sulfide (H ₂ S) in separated geothermal fluid	1.7 ppmw
Assumed factor of safety	1.75
Concentration of H ₂ S in produced geothermal fluid with assumed factor of safety	2.9 ppmw
H ₂ S Emission Factor = EF _{H₂S}	0.000003 lbs/lb
Concentration of Benzene (C ₆ H ₆) in separated geothermal fluid	5.4 ppmw
Assumed factor of safety	1.20
Concentration of C ₆ H ₆ in separated geothermal fluid with assumed factor of safety	6.5 ppmw
C ₆ H ₆ Emission Factor = EF _{C₆H₆}	0.000006 lbs/lb
Concentration of Ammonia (NH ₃) in separated geothermal fluid	141.5 ppmw
Assumed factor of safety	1.50
Concentration of NH ₃ in separated geothermal fluid with assumed factor of safety	212.2 ppmw
NH ₃ Emission Factor = EF _{NH₃}	0.000212 lbs/lb

NCG Pipeline Condensate Drains

Geothermal fluid discharged from NCG pipeline condensate drains	0.3 gal/min
Geothermal fluid density (200°F)	8.00 lbs/gal
Geothermal fluid discharged from NCG pipeline condensate drains	2.4 lbs/min
Geothermal fluid discharged from NCG pipeline condensate drains	144 lbs/hr

(Source: Engineering Estimates)

Concentration of Hydrogen Sulfide (H ₂ S) in separated geothermal fluid	1.7 ppmw
Assumed factor of safety	1.75
Concentration of H ₂ S in produced geothermal fluid with assumed factor of safety	2.9 ppmw
H ₂ S Emission Factor = EF _{H₂S}	0.000003 lbs/lb
Concentration of Benzene (C ₆ H ₆) in separated geothermal fluid	5.4 ppmw
Assumed factor of safety	1.20
Concentration of C ₆ H ₆ in separated geothermal fluid with assumed factor of safety	6.5 ppmw
C ₆ H ₆ Emission Factor = EF _{C₆H₆}	0.000006 lbs/lb
Concentration of Ammonia (NH ₃) in separated geothermal fluid	141.5 ppmw
Assumed factor of safety	1.50
Concentration of NH ₃ in separated geothermal fluid with assumed factor of safety	212.2 ppmw
NH ₃ Emission Factor = EF _{NH₃}	0.000212 lbs/lb

APPENDIX A - SOURCE NOTES

EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT - POTENTIAL TO EMIT NOTES

North Cooling Tower

South Cooling Tower

(Source: AP-42 (5th Ed. - 01/95) Section 13.4 (Wet Cooling Towers) Table 13.4-1 (Particulate Emissions Factors for Wet Cooling Towers))

Percentage total liquid drift (BACT required)	0.0005 percent
Maximum circulating cooling water rate per tower	110,000 gallons per minute
Cooling water density	8.33 lbs/gal
Maximum circulating cooling water rate per tower	27,489 tons per hour
Liquid drift rate	0.000005 lbs total liquid drift/lb of circulating cooling water
Liquid drift rate	0.010000 lbs total liquid drift/ton of circulating cooling water
TDS concentration of circulating water	4,000 ppmw
TDS concentration of circulating water (lb/lb)	0.0040 lbs TDS/lb circulating cooling water
PM10 Emission Factor - PM Emission Factor = EF_{PM10}	0.00004 lbs TDS emitted/ton circulating cooling water

OEC Isopentane Emissions

(Source: Engineering Estimates)

Annual maximum isopentane potential to emit	24.82 tons/yr
Daily isopentane potential to emit based on quarterly inventory reports	136.00 lbs/day
Hourly isopentane potential to emit based on maintenance emissions	87.04 lbs/hr

OEC Fugitive Emissions

Estimated percentage of isopentane emissions	35.95%
Estimated annual fugitive isopentane potential to emit	8.92 tons/yr
Estimated daily fugitive isopentane potential to emit	48.89 lbs/day
Estimated hourly fugitive isopentane potential to emit	2.04 lbs/hr

OEC VRU Units Emissions

Estimated percentage of isopentane emissions	0.05%
Estimate annual OEC VRU isopentane potential to emit	0.01 tons/yr
Estimate daily OEC VRU isopentane potential to emit	0.07 lbs/day
Estimated hourly OEC VRU isopentane potential to emit	0.00 lbs/hr

OEC Maintenance Emissions

Estimated percentage of isopentane emissions	64.00%
Estimated annual maintenance isopentane potential to emit	15.88 tons/yr
Estimated daily maintenance isopentane potential to emit	87.04 lbs/day
Estimated hourly maintenance isopentane potential to emit	87.04 lbs/hr

APPENDIX A - SOURCE NOTES

EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT - POTENTIAL TO EMIT NOTES

Emergency Standby Diesel Fire-Water Pump

Conversions

1 lb =	453.6 g	
1 hp =	0.7457 kW	
1 gallon diesel =	7.1000 lbs	

(Source: Manufacturer Data)

Engine rating	215 kW	288.3197
Fuel Consumption	14.5 gals/hr	
Fuel Consumption	0.479 lbs/kW-hr	
EFNOX + NMHC =	5.510 g/kW-hr	4.108807
EFNOX =	5.370 g/kW-hr	4.004409
EFCO =	0.600 g/kW-hr	0.44742
EFPM10 = PM =	0.090 g/kW-hr	0.067113
EFVOC =	0.140 g/kW-hr	0.104398

(Source: CARB TIER 2 13 CCR 2423 Table 1a (Engines 130 kW ≤ kW < 225 kW (2003-2005 Fabricate) Delayed 3 years for Emergency Fire Pump Engines)

EFNOX + NMHC =	6.600 g/kW-hr	Pass
EFCO =	3.500 g/kW-hr	Pass
EFPM10 = PM =	0.200 g/kW-hr	Pass

(Source: AP-42 (5th Ed. - 10/96) Section 3.4 (Large Stationary Diesel and All Stationary Dual-Fuel Engines) Table 3.4.-1 (Gaseous Emission Factors for Large Stationary Diesel and All Stationary Dual-Fuel Engines))

EF _{SO2} =	0.000012 lb/bhp-hr	
(Calculated from equation $8.09E-03 * S$, where S is the sulfur content (%) in the fuel)		
CARB Diesel Fuel Standard	15 ppm	
CARB Diesel Fuel Standard	0.0015 percent	

(Source: Conversions)

NOx Emission Factor = EF _{NOx}	0.01184 lbs/kW-hr	lbs/bhp-hr	g/bhp-hr
CO Emission Factor = EF _{CO}	0.00132 lbs/kW-hr	0.01587585	7.201287381
PM10 Emission Factor = EF _{PM10}	0.00020 lbs/kW-hr	0.00177384	
ROC Emission Factor = EF _{NMHC}	0.00031 lbs/kW-hr	0.00026608	
SO2 Emission Factor = EF _{SO2}	0.00002 lbs/kW-hr	0.0004139	
		2.1823E-05	

APPENDIX A - SOURCE NOTES

EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT - POTENTIAL TO EMIT NOTES

Emergency Standby Diesel Generator

Conversions

1 lb = 453.6 g
 1 hp = 0.7457 kW
 1 gallon diesel = 7.1000 lbs

(Source: Manufacturer Data)

Engine rating 534.7 kW
 Fuel Consumption 34.0 gals/hr
 Fuel Consumption 0.452 lbs/kW-hr

(Source: CARB TIER 3 (13 CCR 2423 Table 1a (Engines 450 kW < kW < 560 kW (2006-2010 Fabricate)) and ACTM Standards)

EFNOX + NMHC = 4.000 g/kW-hr
 EFCO = 3.500 g/kW-hr
 EFPM10 = PM = 0.200 g/kW-hr

(Source: AP-42 (5th Ed. - 10/96) Section 3.4 (Large Stationary Diesel and All Stationary Dual-Fuel Engines) Table 3.4.-1)

(Gaseous Emission Factors for Large Stationary Diesel and All Stationary Dual-Fuel Engines)
 EFSO2 = 0.000012 lb/bhp-hr
 (Calculated from equation 8.09E-03*S, where S is the sulfur content (%) in the fuel)
 CARB Diesel Fuel Standard 15 ppm
 CARB Diesel Fuel Standard 0.0015 percent

(Source: Engineering estimate based on similar engines)

Ratio EFNOX / (EFNOX + EFNHMC) = 97.46%
 EFNOX = 3.898 g/kW-hr
 EFROC = 0.102 g/kW-hr

(Source: Conversions)

NOx Emission Factor = EF_{NOx} 0.00859 lbs/kW-hr
 CO Emission Factor = EF_{CO} 0.00772 lbs/kW-hr
 PM10 Emission Factor = EF_{PM10} 0.00044 lbs/kW-hr
 ROC Emission Factor = EF_{NMHC} 0.00022 lbs/kW-hr
 SO2 Emission Factor = EF_{SO2} 0.00002 lbs/kW-hr

APPENDIX A - DIESEL HAPS

AP-42 3.3 Industrial Diesel Engines			Annual HAP Emissions		
Compound	Emission Rate for Diesel HAPs	Ratio of Diesel HAPs to Diesel PM	Emergency Standby Diesel Fire Water Pump	Emergency Standby Diesel Generator	Combustion Source Total:
	(lbs/hp-hr)		(tons/yr)		
Diesel Particulate Matter	2.20E-03	1.00E+00	1.07E-03	5.89E-03	6.96E-03
Benzene	9.33E-04	4.24E-01	4.52E-04	2.50E-03	2.95E-03
Toluene	4.09E-04	1.86E-01	1.98E-04	1.10E-03	1.29E-03
Xylene	2.85E-04	1.30E-01	1.38E-04	7.63E-04	9.02E-04
1,3-Butadiene	3.91E-05	1.78E-02	1.90E-05	1.05E-04	1.24E-04
Formaldehyde	1.18E-03	5.36E-01	5.72E-04	3.16E-03	3.73E-03
Acetaldehyde	7.67E-04	3.49E-01	3.72E-04	2.05E-03	2.43E-03
Acrolein	9.25E-05	4.20E-02	4.48E-05	2.48E-04	2.93E-04
Naphthalene	8.48E-05	3.85E-02	4.11E-05	2.27E-04	2.68E-04
		HAP Totals:	1.84E-03	1.02E-02	1.20E-02

APPENDIX B – GAS SCRUBBER DESCRIPTION AND OPERATION

GAS SCRUBBER DESCRIPTION AND OPERATION

ORNI 19, LLC – ORMAT NEVADA, INC. EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT

Packed-bed columns are commonly used to remove gases from liquids and into a stream of air. When used in this manner they are termed “strippers.” Packed-bed columns are also commonly used to dissolve gases into liquids, in which case they are called “scrubbers.” Ormat’s proposed East Brawley scrubber is designed to remove benzene and other geothermal noncondensable gases from the high-pressure noncondensable gas stream and dissolve them into the scrubber liquid, which is then injected into the geothermal reservoir where the noncondensable gases originated.

Packed-bed scrubbers are counter-flow devices. Scrubbing liquid enters from the top of the scrubber while the gas enters from the bottom (see Figure 1). The East Brawley scrubber liquid (cooling tower blowdown) is distributed uniformly across the packing by a header. The packing material is an inert, solid material (here stainless steel), which is randomly packed to provide a bed of uniform porosity and a very large surface area over which the liquid and gases have intimate contact. The base of the scrubber is a sump that collects the scrubbing liquid with the dissolved gases for removal to the cooling tower blowdown injection well. The packing is supported above this sump by a structure that uniformly distributes the gas across the packing and maintains uniform gas velocities. After passing through the bed but before exiting the scrubber outlet a demister is used to prevent carryover of the scrubbing liquid in the gas stream leaving the scrubber. This demister uses the liquid drop’s inertia to contact the demister, coalesce, and fall back into the packed bed.

The efficiency of a scrubber depends principally on two parameters: the concentrations of the transferred gas components in the gas and the scrubbing liquid at equilibrium (the equilibrium parameter) and the concentrations of the transferred gas component in the gas and scrubbing liquid along the scrubber column (the operational parameter). Higher scrubber efficiencies are achieved the farther the operational parameter can be moved from the equilibrium parameter.

Henry’s law states that at a constant temperature, the amount of a gas dissolved in a liquid is directly proportional to the partial pressure of that gas in equilibrium with that liquid. Henry’s Law is typically written as:

$$P_j = k \cdot C_j$$

where P_j = the partial pressure of molecular species j in the gas phase; k = Henry’s law coefficient; and C_j = the concentration fraction of j in the liquid phase. Henry’s law coefficient (k) is a measure of the physical property that reflects how well a particular molecular species partitions itself between a gas (solute) and a liquid (solvent). Henry’s law coefficient (k) is also dependent on temperature.

Scrubber Description and Operation
ORNI 19, LLC – Ormat Nevada, Inc.
East Brawley Geothermal Development Project

The concentration of a molecular species in the gas phase is equal to the ratio of the partial pressure of that molecular species in the gas phase to the total pressure of the gas phase:

$$Y_j = P_j / P$$

where Y_j = the concentration of molecular species j in the gas phase and P = total pressure of the system.

Because the partial pressure of the gases in the noncondensable gas stream goes up with the pressure of the gas in the scrubber, the scrubber is more efficient at transferring the noncondensable gases to the scrubbing liquid as the pressure in the scrubber increases. The operating pressure of the East Brawley scrubber is dependent on the geothermal production wellhead pressures, and Ormat would operate the scrubber at the highest practical operating pressure available from the production wells in order to maximize the quantity of geothermal noncondensable gases transferred to the liquid and injected into the geothermal reservoir.

The quantity of scrubbing liquid passing through the scrubber also has an effect on the quantity of gases transferred to the liquid by the scrubber, as greater quantities of scrubbing liquid drive the operational parameters away from equilibrium. Thus, the scrubber has been designed to operate with the maximum quantity of cooling tower blowdown water which may be available for scrubbing.

In dilute systems, where the flow of gas and liquid does not change appreciably, if G Kmoles/hr of gas, with concentration of $Y1_j$ of transferred component j , enters the bottom of the scrubber, and the desired concentration of the transferred component j in the gas at the top of the scrubber is $Y2_j$, we thus must transfer:

$$G \cdot (Y1_j - Y2_j)$$

Kmoles from the gas into the liquid:

If the liquid enters the top of the scrubber as a pure liquid (that is, without any dissolved component j), the concentration of the transferred gas component j in the liquid there will be $X2_j = 0$ and the concentration of transferred gas component j in the scrubbing liquid at the bottom of the scrubber will be:

$$X1_j = \frac{G \cdot (Y1_j - Y2_j)}{L}$$

where L is the flow of the scrubbing liquid in Kmoles/hr.

Scrubber Description and Operation
ORNI 19, LLC – Ormat Nevada, Inc.
East Brawley Geothermal Development Project

The required height of the absorption column depends on the number of “transfer units,” which is a function of the relationship between the equilibrium and operating parameters. The height of a “transfer unit” is a function of the packing type, the chemicals to be scrubbed and the flow of gas and liquid in the system. It is strongly dependent on the packing and if the system is organic or aqueous, and to a lesser degree on the other properties.

The number of transfer units (N_{OG}) for a dilute system is given by:

$$N_{OG} = \frac{Y1_j - Y2_j}{\Delta Y_{lm}}$$

where ΔY_{lm} is the log mean driving force given by:

$$Y_{lm} = \frac{(Y1_j - Y1_{jEQ}) - (Y2_j - Y2_{jEQ})}{\ln \left(\frac{(Y1_j - Y1_{jEQ})}{(Y2_j - Y2_{jEQ})} \right)}$$

where $Y1_{jEQ}$ = the concentration of transferred gas component j in equilibrium with the concentration of this component in the liquid at the bottom of the scrubber ($X1_j$) and $Y2_{jEQ}$ = the concentration of transferred gas component j in equilibrium with the concentration of this component in the liquid at the top of the scrubber ($X2_j$) [see Figure 1].

The following design and operating parameters for the East Brawley scrubber were developed with the assistance of two consultant engineering firms: Thermochem, Inc of Santa Rosa, California and LUDAN Engineering Co. Ltd of Israel.

The specific East Brawley scrubber column is computer designed for a benzene abatement efficiency of 95 percent. The number of transfer units was calculated using the dilute system equations, above, and the following data:

$G = 415.1$ [Kmole/hr] total noncondensable gas flow

$L = 12,627$ [Kmole/hr] total scrubbing liquid flow (equal to about 1,000 gpm)

$Y1_{Benzene} = 1.654 * 10^{-4}$ (Mole fraction in the inlet gas)

$K_{Benzene} = 572$ [Bar absolute] = Henry's Law Coefficient for benzene

$P = 26.15$ [Bar absolute] = Total system pressure

Benzene transfer efficiency from the gas phase to the liquid aqueous phase = 95 percent

Scrubber Description and Operation
ORNI 19, LLC – Ormat Nevada, Inc.
East Brawley Geothermal Development Project

$$Y_{2\text{Benzene}} = 1.654 \cdot 10^{-4} * (1.00 - 95\%) = 8.27 \cdot 10^{-6} \text{ (Mole fraction in outlet gas)}$$

$$X_{2\text{Benzene}} = 0 \text{ (Mole fraction in the water with no benzene at the scrubber liquid inlet)}$$

$$\begin{aligned} X_{1\text{Benzene}} &= (415.1/12,627) * (1.654 \cdot 10^{-4} - 8.27 \cdot 10^{-6}) \\ &= 5.165 \cdot 10^{-6} \text{ (Mole fraction in the outlet liquid at the bottom of the scrubber)} \end{aligned}$$

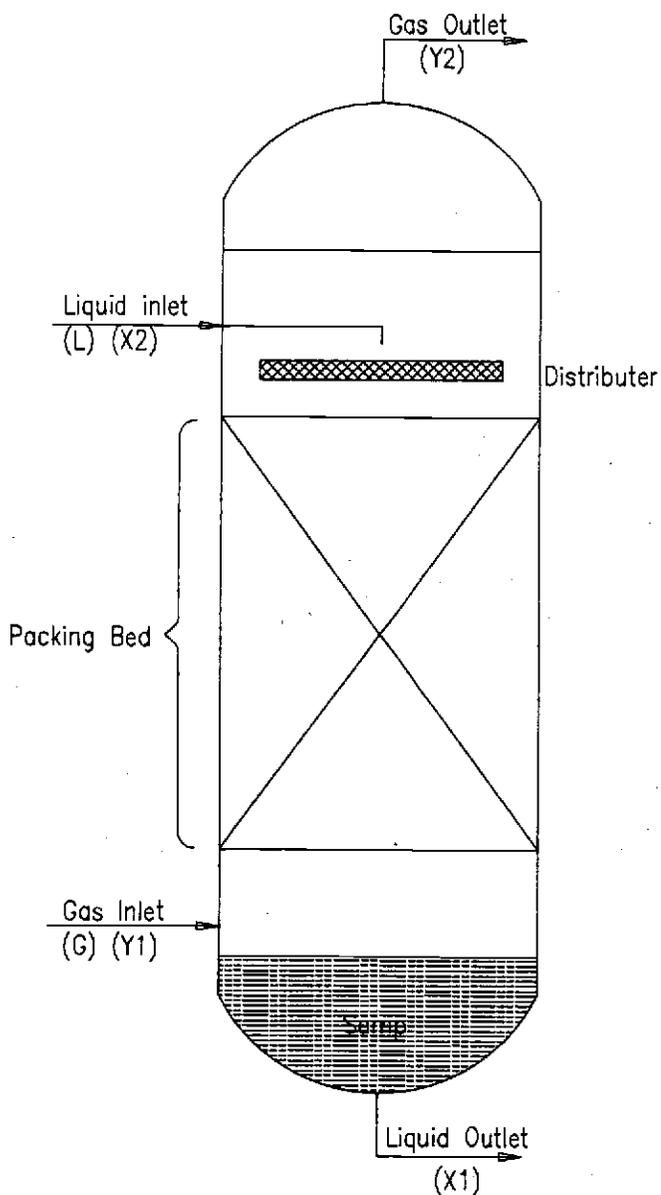
$$Y_{2EQ} = 0 \text{ (Mole fraction of the gas in equilibrium with the pure water entering the scrubber)}$$

$$Y_{1EQ} = (K_{\text{Benzene}} * X_{1\text{Benzene}} / P) = (572 * 5.165 \cdot 10^{-6} / 26.15) = 1.13 \cdot 10^{-4}$$

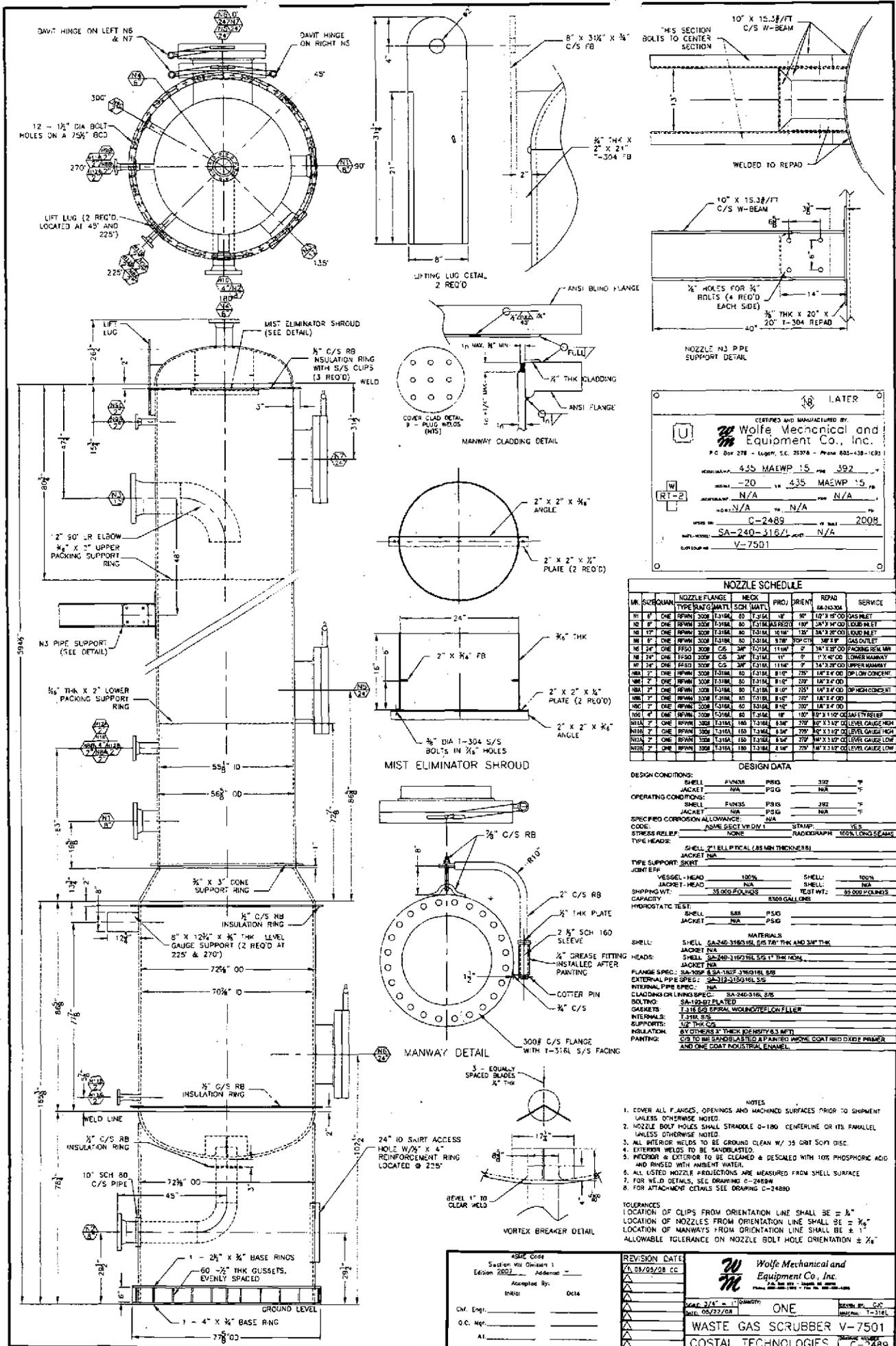
By substituting these factors into the dilute system equations we derive that 6.573 transfer units would be required to remove 95 percent of the benzene from this gas stream.

The height of a transfer unit was computer-calculated using Onda's Method. Using the same data as above; plus gas and liquid diffusivities, viscosities and densities and parameters specific to the packing materials, a transfer unit height of 1.024 meters was calculated. Combining these two values we calculate that a scrubber with 6.73 meters of the proscribed packing material (6.573 transfer units, each 1.024 meters in height), can absorb 95 percent of the benzene from the noncondensable gas stream using a cooling tower blowdown flow of 1,000 gpm. At a 95 percent abatement efficiency, the scrubber can remove about 10.64 lbs/hr of the 11.2 lbs/hr benzene entering the scrubber, resulting in a benzene emission rate of 0.56 lbs/hr.

A design overview of the scrubber is attached as Figure 2.



T.M.L.:	SURFACE ROUGHNESS:	BREAK SHARP EDGES:	GENERAL TOLERANCES:
CODE MATERIAL:	FINISH:	FILE No:	WEIGHT:
 APPROVED: 13.07.08 Y.N.	 THIS DRAWING IS THE PROPERTY OF ORMAT AND MUST NOT BE COPIED OR REISSUED WITHOUT PERMISSION	TITLE: NCG SERUBBER GENERAL DRAWING	
CHECKED: 13.07.08 Y.N.		DRAWING NO: 7.013.00.211.0	SCALE: 1:1
Q.C.:	DRAWN: 13.07.08 K.G.		



LATER

CERTIFIED AND MANUFACTURED BY:

Wolfe Mechanical and Equipment Co., Inc.

P.O. Box 278 - Logan, S.C. 29376 - Phone 803-438-1131

DESIGN NO.	435 MAEWP 15	REV.	392
DATE	20	BY	435 MAEWP 15
APPROVED BY	N/A	DATE	N/A
PROJECT NO.	C-2489	DATE	2008
REV. NO.	SA-240-316/1	DATE	N/A
REV. DESCRIPTION	V-7501	DATE	N/A

NO.	SUBQUAN.	NOZZLE FLANGE	NOZZLE	PROJ.	ORIENT.	REPAI.	SERVICE
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD GAS INLET
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD LIQUID INLET
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD GAS OUTLET
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD LIQUID OUTLET
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD LOWER MANWAY
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD UPPER MANWAY
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD UPPER CONCERN
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD LOWER CONCERN
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD UPPER CONCERN
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD LOWER CONCERN
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD SAFETY RELIEF
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD LEVEL GAUGE HIGH
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD LEVEL GAUGE HIGH
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD LEVEL GAUGE LOW
10	17	ONE	RFPMW 300P	1318A	80	1318A	10" 107.3" OD LEVEL GAUGE LOW

DESIGN DATA

DESIGN CONDITIONS:

SHELL	PUNGS	PSIG	392	°F
JACKET	N/A	PSIG	N/A	°F

OPERATING CONDITIONS:

SHELL	PUNGS	PSIG	392	°F
JACKET	N/A	PSIG	N/A	°F

SPECIFIC CORROSION ALLOWANCE: N/A

CODE: NONE

STRESS RELIEF: NONE

TYPE HEADS: SHELL 2" ELLIPTICAL (25 MIN THICKNESS)

TYPE SUPPORT SKIRT

JACKET N/A

JOINT EFF:

VESSEL-HEAD	100%	SHELL	100%
JACKET-HEAD	N/A	SHELL	N/A

SHIPPING WT: 35,000 POUNDS

HYDROSTATIC TEST:

SHELL	588	PSIG
JACKET	N/A	PSIG

MATERIALS

SHELL: SA-240-316/1 5/8" THK AND 3/4" THK

JACKET: N/A

HEADS: SHELL SA-240-316/1 5/8" THK AND 3/4" THK

JACKET: N/A

FLANGE SPEC: SA-1008 & SA-1007 3/8" THK 5/8"

EXTERNAL PIPE SPEC: SA-312-316/1 5/8"

INTERNAL PIPE SPEC: N/A

CLADDING OR LINING SPEC: SA-240-316/1 5/8"

BOLTING: SA-193-97 PLATED

GASKETS: 1.318 EPTAL NONMETALIC CONTROLLER

INTERNALS: 1.318 S/S

SUPPORTS: 1/2" THK S/S

INSULATION: 3" MINIMUM

PAINTING: CS TO BE SANDBLASTED & PAINTED. INTERIOR COAT RED OXIDE PRIMER AND ONE COAT INDUSTRIAL ENAMEL.

- NOTES
- COVER ALL FLANGES, OPENINGS AND MACHINED SURFACES PRIOR TO SHIPMENT UNLESS OTHERWISE NOTED.
 - NOZZLE BOLT HOLES SHALL STRADDLE Q-180 CENTERLINE OR ITS PARALLEL UNLESS OTHERWISE NOTED.
 - ALL INTERIOR WELDS TO BE GRIND CLEAN Q-180 CENTERLINE OR ITS PARALLEL UNLESS OTHERWISE NOTED.
 - EXTERIOR WELDS TO BE SANDBLASTED.
 - INTERIOR & EXTERIOR TO BE CLEANED & DESEALED WITH 10% PHOSPHORIC ACID AND RINSED WITH AMBIENT WATER.
 - ALL LISTED NOZZLE REFLECTIONS ARE MEASURED FROM SHELL SURFACE.
 - FOR WELD DETAILS, SEE DRAWING C-2489B.
 - FOR ATTACHMENT DETAILS SEE DRAWING C-2489D.

TOLERANCES

LOCATION OF CLIPS FROM ORIENTATION LINE SHALL BE ± 3/8"

LOCATION OF NOZZLES FROM ORIENTATION LINE SHALL BE ± 3/8"

LOCATION OF MANWAYS FROM ORIENTATION LINE SHALL BE ± 1"

ALLOWABLE TOLERANCE ON NOZZLE BOLT HOLE ORIENTATION ± 3/8"

ASME Code Section VIII Division 1 Edition 2002

Accepted By: _____

DATE: 05/23/08

CM. Engr. _____

O.C. Mfr. _____

AT _____

REVISION DATE: 05/23/08

Wolfe Mechanical and Equipment Co., Inc.

Scale: 3/4" = 1' DRAWING NO. ONE

WASTE GAS SCRUBBER V-7501

COSTAL TECHNOLOGIES

**APPENDIX C – ASSESSMENT OF POTENTIAL HEALTH RISKS FROM BENZENE EMISSIONS
FROM THE NONCONDENSIBLE GAS SCRUBBER VENT STACK**



ENVIRONMENTAL MANAGEMENT ASSOCIATES

October 29, 2008

via Email and U.S. Mail

Mr. Ron Leiken
Environmental/Regulatory Affairs Administrator
Ormat Nevada, Inc.
6225 Neil Road
Reno, Nevada 89511-1153

Re: East Brawley Geothermal Project – Assessment of Potential Health Risks from Benzene and Hydrogen Sulfide Emissions from the Noncondensable Gas Scrubber Vent Stack

Dear Ron:

Pursuant to your request, Environmental Management Associates, Inc. (EMA) has prepared this assessment of the potential health risks from benzene and hydrogen sulfide emissions from the proposed East Brawley Geothermal Project (Project) noncondensable gas scrubber vent stack. Based on the analysis described below, the Project emissions of benzene and hydrogen sulfide produce modeled concentrations at the closest occupied residences and commercial/industrial facilities which are far below those at which any adverse acute (short-term) or chronic (long-term) health effects would be expected. A conservative calculation of the lifetime average daily dose of benzene at the maximally exposed individual resident receptor and the working lifetime average daily dose of benzene at the maximally exposed individual worker produced cancer risks that are generally found acceptable.

Introduction

The Project is located just north-northeast of the City of Brawley in Imperial County, California (see Figure 1 and Figure 2). The Project consists of a new 49.9 MW (net) binary power plant; a geothermal well field; and pipelines to bring the geothermal fluids produced from the production wells to the power plant and spent geothermal fluids to the injection wells for injection into the geothermal reservoir. The emitted benzene and hydrogen sulfide is contained in naturally occurring gases produced with the geothermal fluids used to power the power plant. The geothermal fluids flow from the production wells through closed, high pressure well pad separators which would separate most of the geothermal noncondensable gases from the geothermal brine. Approximately seventy-five percent of the separated geothermal

noncondensable gases would flow through dedicated pipelines to be dissolved/entrained in the geothermal brine as it is injected into the geothermal fluid injection wells.

The remaining approximately twenty-five percent of these separated geothermal noncondensable gases would flow through other dedicated pipelines to the geothermal noncondensable gas scrubbing system located at the power plant site. These noncondensable gases would be treated by a gas scrubber, which would remove most of the hydrogen sulfide and benzene, and some of the carbon dioxide, by scrubbing the gases with the cooling tower blowdown water. The scrubbed gases which dissolve in the cooling tower blowdown water would be injected with the cooling tower blowdown water into the geothermal reservoir through dedicated injection wells. The scrubbed noncondensable gases which do not dissolve in the scrubbing liquid would be discharge to the atmosphere through a vent gas stack.

This assessment followed the guidance presented in the current version of "The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (August 2003)" produced by the Office of Environmental Health Hazard Assessment (OEHHA), California Environmental Protection Agency. The four steps involved in the risk assessment process are 1) hazard identification, 2) exposure assessment, 3) dose-response assessment, and 4) risk characterization.

Hazard Identification

The emission of benzene and hydrogen sulfide from the Project scrubber has been identified as a potential hazard by the Imperial County Air Pollution Control District (ICAPCD). Both air pollutants are also listed among the hazardous substances designated in the California Air Resources Board's Emission Inventory Criteria and Guidelines Regulations (Title 17, California Code of Regulations, Sections 93300-93300.5).

Exposure Assessment

The purpose of the exposure assessment is to estimate the extent of public exposure to each substance for which potential cancer risk or acute and chronic noncancer effects will be evaluated. This involves emission quantification, modeling of environmental transport, evaluation of environmental fate, identification of exposure routes, identification of exposed populations, and estimation of short-term and long-term exposure levels.

For the exposure assessment EMA used the U.S. Environmental Protection Agency (USEPA)-approved AMS/EPA Regulatory Model (AERMOD) (Version 07026). The Trinity Consultants *BREEZE AERMOD GIS Pro v6* modeling manager was used to prepare the input files and manage the AERMOD processing. The model was run using the PRIME building downwash algorithms and USEPA regulatory defaults.

The modeling used five calendar years (1995 through 1999) of surface meteorological data from the National Weather Service Imperial Airport meteorological station provided by the ICAPCD. This surface data was processed using AERMET (Version 06341) with corresponding upper air

meteorological data from the National Weather Service Tucson (23160) meteorological station. Windrose plots of the five meteorological data sets are attached as ATTACHMENT A.

To determine the maximally exposed individual resident (MEIR), all existing residences within an approximately one-mile radius of the scrubber stack were identified and plotted using Google Earth (see Figure 3). To determine the maximally exposed individual worker (MEIW), existing commercial and industrial sites within this same approximately one-mile radius of the scrubber stack were also identified and plotted using Google Earth (see Figure 4). The locations of each of these identified receptors are attached as ATTACHMENT B.

Elevations for all modeled receptors were electronically generated through the *BREEZE AERMOD GIS Pro v6* modeling manager using AERMAP (Version 06341) and the following U.S. Geological Survey (USGS) 30-Meter Digital Elevation Model (DEM) files to determine receptor elevations and calculate hill height scale factors: Wiest (33115A4), Westmorland East (33115A5), Alamorio (32115H4) and Brawley (32115H5). The DEM domain (for calculating hill height scale factors) was set to at least 5,000 meters outside the outer receptors. The modeled terrain elevation for each receptor was determined by interpolating between the four ".DEM" points surrounding each receptor.

Building wake (downwash) effects were calculated for all buildings or other major structures located proximate to the scrubber stack (see Figure 5). Each applicable building/structure was located and sized using location information developed from a Facility plot plan provided by Ormat. Building dimensions, including building heights provided by Ormat, are attached as ATTACHMENT B. Applicable building downwash effects for all buildings were calculated using the USEPA Building Profile Input Program (BPIP) algorithms of the AERMOD program (version 04274).

This assessment used 0.56 lbs/hr as its benzene emission rate and 0.43 lbs/hr as its hydrogen sulfide emission rate from the scrubber, which are the benzene and hydrogen sulfide emission rates quantified in the application to the ICAPCD for the Authority to Construct for the Project. A summary of the emission source parameters used in the modeling for the scrubber is attached as ATTACHMENT B. The scrubber was located using location information developed from a Facility plot plan provided by Ormat (see Figure 5).

The scrubber benzene and hydrogen sulfide emissions were modeled using the stack height, stack diameter, stack velocity and stack gas temperature provided by Ormat. Because the scrubber uses cooling tower blowdown as the scrubbing liquid, it raises the temperature of the scrubbed gases approximately 20°F over the ambient air. To model this temperature rise, the scrubber stack gases were modeled using a temperature of -11.11 K, which directs the model to add 20°F to the meteorological temperature for each modeled hour. The scrubber emissions were modeled using the conservative assumption that the scrubber emits 24-hours per day and 8,760 hours per year at the maximum hourly emission rate.

The elevation for the scrubber emission source was electronically generated through the *BREEZE AERMOD GIS Pro v6* modeling manager using AERMAP (Version 06341) and the

following U.S. Geological Survey (USGS) 30-Meter Digital Elevation Model (DEM) file: Westmorland East (33115A5). The terrain elevation for the scrubber was interpolated from the four “.DEM” points surrounding this source.

One model run was conducted to evaluate the ambient benzene concentration at each receptor for both the six-hour (acute noncancer) and annual (chronic noncancer and cancer) averaging time periods for each of the five meteorological data sets, for a total of five benzene model runs. One model run was also conducted to evaluate the ambient hydrogen sulfide concentration at each receptor for both the one-hour (acute noncancer) and annual (chronic noncancer) averaging time periods for each of the five meteorological data sets, for a total of five hydrogen sulfide model runs. Electronic copies of the input and output files for these model runs, including the meteorological data and DEM files, are attached as ATTACHMENT C.

Table 1 lists the residential receptors with the highest modeled six-hour and annual benzene concentrations for each year and for all five years modeled. Table 2 lists the residential receptors with the highest modeled one-hour and annual hydrogen sulfide concentrations for each year and for all five years modeled.

Table 1: Summary of Highest Residential Benzene Concentrations

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Elevation (meters)	Modeled Benzene Concentrations (µg/m3)	
		Easting	Northing		6 hr	Annual
1999	Residence 1	639117	3654018	-43.89	0.99111	
	Residence 2	639272	3654070	-44.20		0.17099
1998	Residence 1	639117	3654018	-43.89	2.88660	
	Residence 2	639272	3654070	-44.20		0.17804
1997	Residence 1	639117	3654018	-43.89	3.30515	
	Residence 1	639117	3654018	-43.89		0.16993
1996	Residence 1	639117	3654018	-43.89	1.44568	
	Residence 1	639117	3654018	-43.89		0.16706
1995	Residence 2	639272	3654070	-44.20	1.11061	
	Residence 1	639117	3654018	-43.89		0.15959
MAXIMUMS	Residence 1	639117	3654018	-43.89	3.30515	
	Residence 2	639272	3654070	-44.20		0.17804

Table 2: Summary of Highest Residential Hydrogen Sulfide Concentrations

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Elevation (meters)	Modeled Hydrogen Sulfide Concentrations (µg/m3)	
		Easting	Northing		1 hr	Annual
1999	Residence 1	639117	3654018	-43.89	2.90831	
	Residence 2	639272	3654070	-44.20		0.13054
1998	Residence 1	639117	3654018	-43.89	12.33156	
	Residence 2	639272	3654070	-44.20		0.13592
1997	Residence 1	639117	3654018	-43.89	12.27905	
	Residence 1	639117	3654018	-43.89		0.12974
1996	Residence 1	639117	3654018	-43.89	3.03769	
	Residence 1	639117	3654018	-43.89		0.12755
1995	Residence 1	639117	3654018	-43.89	2.95719	
	Residence 1	639117	3654018	-43.89		0.12184
MAXIMUMS	Residence 1	639117	3654018	-43.89	12.33156	
	Residence 2	639272	3654070	-44.20		0.13592

Ormat has entered into agreements with the owners of Residence 1 and Residence 2 which will result in the demolition of both of these residences prior to the operation of the Project, thus removing these existing residences from exposure to the air toxics emitted by the Project operations. With these two residences removed, Table 3 lists the remaining residential receptors with the highest modeled six-hour and annual benzene concentrations for each year and for all five years modeled. Table 4 lists the remaining residential receptors with the highest modeled one-hour and annual hydrogen sulfide concentrations for each year and for all five years modeled.

Table 3: Summary of Highest Remaining Residential Benzene Concentrations

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Elevation (meters)	Modeled Benzene Concentrations (µg/m3)	
		Easting	Northing		6 hr	Annual
1999	Residence 3	639110	3653627	-42.67	0.14533	
	Residence 3	639110	3653627	-42.67		0.01942
1998	Residence 4	639287	3654828	-44.50	1.00641	
	Residence 4	639287	3654828	-44.50		0.02534
1997	Residence 4	639287	3654828	-44.50	1.00043	
	Residence 4	639287	3654828	-44.50		0.02544
1996	Residence 3	639110	3653627	-42.67	0.15936	
	Residence 4	639287	3654828	-44.50		0.02188
1995	Residence 4	639287	3654828	-44.20	0.27735	
	Residence 4	639287	3654828	-44.20		0.02351
MAXIMUMS	Residence 4	639287	3654828	-44.50	1.00641	
	Residence 4	639287	3654828	-44.50		0.02544

Table 4: Summary of Highest Remaining Residential Hydrogen Sulfide Concentrations

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Elevation (meters)	Modeled Hydrogen Sulfide Concentrations (µg/m3)	
		Easting	Northing		1 hr	Annual
1999	Residence 4	639287	3654828	-44.50	0.25866	
	Residence 3	639110	3653627	-42.67		0.01483
1998	Residence 4	639287	3654828	-44.50	3.69697	
	Residence 4	639287	3654828	-44.50		0.01934
1997	Residence 4	639287	3654828	-44.50	2.77038	
	Residence 4	639287	3654828	-44.50		0.01943
1996	Residence 3	639110	3653627	-42.67	0.30544	
	Residence 4	639287	3654828	-44.50		0.01670
1995	Residence 4	639287	3654828	-44.50	1.12670	
	Residence 4	639287	3654828	-44.50		0.01795
MAXIMUMS	Residence 4	639287	3654828	-44.50	3.69697	
	Residence 4	639287	3654828	-44.50		0.01943

Table 5 lists the worker site receptors with the highest modeled six-hour and annual benzene concentrations for each year and for all five years modeled. Table 6 lists the worker site receptors with the highest modeled one-hour and annual hydrogen sulfide concentrations for each year and for all five years modeled.

Table 5: Summary of Highest Worker Benzene Concentrations

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Elevation (meters)	Modeled Benzene Concentrations (µg/m3)	
		Easting	Northing		6 hr	Annual
1999	Commercial 6	638574	3654650	-56.05	0.28829	
	Commercial 6	638574	3654650	-56.05		0.02823
1998	Commercial 6	638574	3654650	-56.05	1.27383	
	Commercial 6	638574	3654650	-56.05		0.02988
1997	Commercial 6	638574	3654650	-56.05	1.05041	
	Commercial 6	638574	3654650	-56.05		0.03334
1996	Commercial 6	638574	3654650	-56.05	0.29658	
	Commercial 6	638574	3654650	-56.05		0.02735
1995	Industrial 1	638444	3654021	-48.94	0.69804	
	Commercial 6	638444	3654021	-48.94		0.02802
MAXIMUMS	Commercial 6	638574	3654650	-56.05	1.27383	
	Commercial 6	638574	3654650	-56.05		0.03334

Table 6: Summary of Highest Worker Hydrogen Sulfide Concentrations

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Elevation (meters)	Modeled Hydrogen Sulfide Concentrations (µg/m ³)	
		Easting	Northing		1 hr	Annual
1999	Commercial 6	638574	3654650	-56.05	0.70841	
	Commercial 6	638574	3654650	-56.05		0.02155
1998	Commercial 6	638574	3654650	-56.05	5.17522	
	Commercial 6	638574	3654650	-56.05		0.02281
1997	Commercial 6	638574	3654650	-56.05	4.46022	
	Commercial 6	638574	3654650	-56.05		0.02545
1996	Industrial 1	638444	3654021	-48.94	1.00224	
	Commercial 6	638574	3654650	-56.05		0.02088
1995	Commercial 6	638574	3654650	-56.05	2.47605	
	Commercial 6	638574	3654650	-56.05		0.02139
MAXIMUMS	Commercial 6	638574	3654650	-56.05	5.17522	
	Commercial 6	638574	3654650	-56.05		0.02545

Dose-Response Assessment

Dose-response assessment is the process of characterizing the relationship between exposure to an agent and incidence of an adverse health effect in exposed populations. For noncarcinogenic effects, dose-response data developed from animal or human studies were used by OEHHA to develop acute and chronic noncancer Reference Exposure Levels (RELs), which are defined as the concentration at which no adverse noncancer health effects are anticipated. Thus, if the acute or chronic hazard quotients (which are derived by dividing the modeled air toxic short-term or annual concentrations by the acute or chronic RELs, respectively, for that air toxic) are less than 1.0, no adverse noncancer health effects are anticipated.

Each substance targets one or more defined organ systems. Acute exposures to benzene target the hematologic system, the immune system and reproductive/developmental organs, whereas acute exposures to hydrogen sulfide target only the nervous system. Chronic exposures to benzene target developmental organs, the hematopoietic system and the nervous system, while chronic exposures to hydrogen sulfide target only the respiratory system. Because these two substances target different organ systems, the effects of exposure to benzene and hydrogen sulfide are not additive.

Cancer potency factors developed by OEHHA are expressed as the upper bound probability of developing cancer. For residential receptors, the upper bound probability conservatively assumes a continuous lifetime exposure to a substance at a dose of one milligram per kilogram of body weight, and is expressed in units of inverse dose as a potency slope [i.e., (mg/kg/day)⁻¹]. Multiplication of the average daily inhalation dose over 70 years (mg/kg-day) with the cancer potency factor (mg/kg-day)⁻¹ will give the inhalation cancer risk (unitless). For off-site workers, the standard default assumption is that the worker is present for 5 days per week, 49 weeks per year, for 40 years which, for continuous emission sources such as the Project, is equal to the residential receptor risk times an adjustment factor of 0.2199. Another common cancer potency

expression is in units of inverse concentration $[(\text{mg}/\text{m}^3)^{-1}]$ where the slope is based on exposure concentration rather than dose; this is termed the unit risk factor.

It is assumed in cancer risk assessments that risk is directly proportional to dose and that there is no threshold for carcinogenesis. Although the ICAPCD has not formally adopted cancer risk thresholds, it is generally accepted that a project cancer risk of less than one in one million is below *de minimus* levels. Benzene is considered a carcinogen, while hydrogen sulfide is not.

Risk Characterization

Risk characterization consists of combining the modeled concentrations and public exposure information, which are determined through the exposure assessment, with the cancer potency factors and RELs that are developed through the dose-response assessment. Acute and chronic noncancer risks are calculated separately for each target organ system, and are not summed across targeted organs. Table 7 lists the receptors (other than Residence 1 or Residence 2) with the highest modeled six-hour (acute) benzene concentrations for each year and for all five years modeled, and the OEHHA-derived benzene acute REL, which is applicable to the hematologic system, the immune system and the reproductive/developmental organs. The maximum acute hazard quotient (derived by dividing the modeled concentration by the acute REL) is less than 0.10 percent of the acute REL, so no adverse acute health effects to the hematologic system, the immune system or reproductive/developmental organs are anticipated.

Table 7: Summary of Acute Noncancer Risk from Benzene

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Elevation (meters)	Modeled Concentrations 6 hr ($\mu\text{g}/\text{m}^3$)	Acute REL ($\mu\text{g}/\text{m}^3$)	Acute Hazard Index
		Easting	Northing				
1999	Commercial 6	638574	3654650	-56.05	0.28829	1300	0.00022
1998	Commercial 6	638574	3654650	-56.05	1.27383	1300	0.00098
1997	Commercial 6	638574	3654650	-56.05	1.05041	1300	0.00081
1996	Commercial 6	638574	3654650	-56.05	0.29658	1300	0.00023
1995	Industrial 1	638444	3654021	-48.94	0.69804	1300	0.00054
MAXIMUM	Commercial 6	638574	3654650	-56.05	1.27383	1300	0.00098

Table 8 lists the remaining receptors with the highest modeled one-hour (acute) hydrogen sulfide concentrations for each year and for all five years modeled, and the OEHHA-derived hydrogen sulfide acute REL, which is applicable only to the nervous system. The maximum acute hazard quotient is less than 12.4 percent of the acute REL (which is set equal to the state ambient air quality standard, which is a nuisance [odor] threshold), so no adverse acute health effects to the nervous system are anticipated.

Table 8: Summary of Acute Noncancer Risk from Hydrogen Sulfide

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Elevation (meters)	Modeled Concentrations 1 hr (µg/m3)	Acute REL (µg/m3)	Acute Hazard Index
		Easting	Northing				
1999	Commercial 6	638574	3654650	-56.05	0.70841	42	0.01687
1998	Commercial 6	638574	3654650	-56.05	5.17522	42	0.12322
1997	Commercial 6	638574	3654650	-56.05	4.46022	42	0.10620
1996	Industrial 1	638444	3654021	-48.94	1.00224	42	0.02386
1995	Commercial 6	638574	3654650	-56.05	2.47605	42	0.05895
MAXIMUM	Commercial 6	638574	3654650	-56.05	5.17522	42	0.12322

Table 9 lists the remaining receptors with the highest modeled annual benzene concentrations for each year and for all five years modeled, and the OEHHA-derived chronic benzene REL, which is applicable to developmental organs, the hematopoietic system and the nervous system. The maximum benzene chronic hazard quotient (derived by dividing the modeled concentration by the chronic REL) is less than 0.06 percent of the chronic REL, so no adverse chronic health effects to developmental organs, the hematopoietic system and the nervous system are anticipated.

Table 9: Summary of Chronic Noncancer Risk from Benzene

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Elevation (meters)	Modeled Concentrations Annual (µg/m3)	Chronic REL (µg/m3)	Chronic Hazard Index
		Easting	Northing				
1999	Commercial 6	638574	3654650	-56.05	0.02823	60	0.00047
1998	Commercial 6	638574	3654650	-56.05	0.02988	60	0.00050
1997	Commercial 6	638574	3654650	-56.05	0.03334	60	0.00056
1996	Commercial 6	638574	3654650	-56.05	0.02735	60	0.00046
1995	Commercial 6	638574	3654650	-56.05	0.02802	60	0.00047
MAXIMUM	Commercial 6	638574	3654650	-56.05	0.03334	60	0.00056

Table 10 lists the remaining receptors with the highest modeled annual hydrogen sulfide concentrations for each year and for all five years modeled, and the OEHHA-derived chronic hydrogen sulfide REL, which is applicable to only the respiratory system. The maximum hydrogen sulfide chronic hazard quotient is less than 0.26 percent of the chronic hydrogen sulfide REL, so no adverse chronic health effects to the respiratory system are anticipated.

Table 10: Summary of Chronic Noncancer Risk from Hydrogen Sulfide

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Elevation (meters)	Modeled Concentrations Annual ($\mu\text{g}/\text{m}^3$)	Chronic REL ($\mu\text{g}/\text{m}^3$)	Chronic Hazard Index
		Easting	Northing				
1999	Commercial 6	638574	3654650	-56.05	0.02155	10	0.00216
1998	Commercial 6	638574	3654650	-56.05	0.02281	10	0.00228
1997	Commercial 6	638574	3654650	-56.05	0.02545	10	0.00255
1996	Commercial 6	638574	3654650	-56.05	0.02088	10	0.00209
1995	Commercial 6	638574	3654650	-56.05	0.02139	10	0.00214
MAXIMUM	Commercial 6	638574	3654650	-56.05	0.02545	10	0.00255

Table 11 lists the remaining residential receptors with the highest modeled annual benzene concentrations for each year and for all five years modeled, and the OEHHA-derived benzene unit cancer risk (hydrogen sulfide has no unit cancer risk). The dimensionless maximum cancer risk (derived by multiplying the modeled concentration by the unit risk) from benzene is less than 0.74 cancers per million population, which is below the generally accepted *de minimus* project cancer risk of one in one million.

Table 11: Summary of Benzene Residential Cancer Risk (Unit Risk)

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Modeled Concentrations Annual ($\mu\text{g}/\text{m}^3$)	Unit Risk $1/(\mu\text{g}/\text{m}^3)$	Cancer Risk
		Easting	Northing			
1999	Residence 3	639110	3653627	0.01942	2.90E-05	5.63E-07
1998	Residence 4	639287	3654828	0.02534	2.90E-05	7.35E-07
1997	Residence 4	639287	3654828	0.02544	2.90E-05	7.38E-07
1996	Residence 4	639287	3654828	0.02188	2.90E-05	6.35E-07
1995	Residence 4	639287	3654828	0.02351	2.90E-05	6.82E-07
MAXIMUM	Residence 4	639287	3654828	0.02544	2.90E-05	7.38E-07

Table 12 lists the worker receptors with the highest modeled annual benzene concentrations for each year and for all five years modeled, and the OEHHA-derived benzene unit cancer risk. The dimensionless maximum worker cancer risk from benzene is less than 0.22 cancers per million workers, which is substantially less than the residential cancer risk from the same benzene exposure because of the application of the worker risk adjustment factor.

Table 12: Summary of Benzene Worker Cancer Risk (Unit Risk)

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Modeled Concentrations Annual ($\mu\text{g}/\text{m}^3$)	Unit Risk $1/(\mu\text{g}/\text{m}^3)$	Worker Adjustment Factor	Cancer Risk
		Easting	Northing				
1999	Commercial 6	638574	3654650	0.02823	2.90E-05	0.2199	1.80E-07
1998	Commercial 6	638574	3654650	0.02988	2.90E-05	0.2199	1.91E-07
1997	Commercial 6	638574	3654650	0.03334	2.90E-05	0.2199	2.13E-07
1996	Commercial 6	638574	3654650	0.02735	2.90E-05	0.2199	1.74E-07
1995	Industrial 1	638444	3654021	0.02802	2.90E-05	0.2199	1.79E-07
MAXIMUM	Commercial 6	638574	3654650	0.03334	2.90E-05	0.2199	2.13E-07

Table 13 lists the remaining residential receptors with the highest modeled annual benzene concentrations for each year and for all five years modeled, and the OEHHA-derived benzene cancer inhalation potency factor (hydrogen sulfide has no cancer inhalation potency factor). The benzene inhalation dose is calculated by multiplying the modeled maximum annual benzene concentration times the daily breathing rate (393 liters/kg body weight) times the inhalation absorption factor (1) times the exposure frequency (350 days/yr) times the exposure duration (70 yrs) divided by the averaging time period (25,550 days/70 yrs). (OEHHA-recommended defaults used in the calculation are shown in parenthesis.) The dimensionless maximum cancer risk (derived by multiplying the inhalation potency factor by the inhalation dose) from benzene is less than 0.96 cancers per million population, slightly higher than the 0.74 cancers per million population calculated using the benzene unit risk factor, but still below the generally accepted *de minimus* project cancer risk of one in one million.

Table 13: Summary of Benzene Residential Cancer Risk (Cancer Potency Factor)

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Modeled Annual Concentrations ($\mu\text{g}/\text{m}^3$)	Inhalation Potency Factor ($\text{mg}/\text{kg}\text{-day}$)-1	Inhalation Dose ($\text{mg}/\text{kg}\text{-day}$)	Cancer Risk
		Easting	Northing				
1999	Residence 3	639110	3653627	0.01942	1.00E-01	7.32E-06	7.32E-07
1998	Residence 4	639287	3654828	0.02534	1.00E-01	9.55E-06	9.55E-07
1997	Residence 4	639287	3654828	0.02544	1.00E-01	9.59E-06	9.59E-07
1996	Residence 4	639287	3654828	0.02188	1.00E-01	8.25E-06	8.25E-07
1995	Residence 4	639287	3654828	0.02351	1.00E-01	8.86E-06	8.86E-07
MAXIMUM	Residence 4	639287	3654828	0.02544	1.00E-01	9.59E-06	9.59E-07

Table 14 lists the worker receptors with the highest modeled annual benzene concentrations for each year and for all five years modeled, and the OEHHA-derived benzene cancer inhalation potency factor. The worker maximum cancer risk is derived by multiplying the residential inhalation potency factor by the residential inhalation dose, then multiplying by the worker adjustment factor. The resulting worker maximum cancer risk from benzene is less than 0.28 cancers per million workers, slightly higher than the less than 0.22 cancers per million workers calculated using the benzene unit risk factor, but substantially less than the residential cancer risk from the same benzene exposure because of the inclusion of the worker risk adjustment factor.

Table 14: Summary of Benzene Worker Cancer Risk (Cancer Potency Factor)

Model Year	Highest Concentration Receptor	UTM (meters - NAD83)		Modeled Annual Concentrations ($\mu\text{g}/\text{m}^3$)	Inhalation Potency Factor ($\text{mg}/\text{kg}\text{-day}$)-1	Inhalation Dose ($\text{mg}/\text{kg}\text{-day}$)	Worker Adjustment Factor	Cancer Risk
		Easting	Northing					
1999	Commercial 6	638574	3654650	0.02823	1.00E-01	1.06E-05	0.2199	2.34E-07
1998	Commercial 6	638574	3654650	0.02988	1.00E-01	1.13E-05	0.2199	2.48E-07
1997	Commercial 6	638574	3654650	0.03334	1.00E-01	1.26E-05	0.2199	2.76E-07
1996	Commercial 6	638574	3654650	0.02735	1.00E-01	1.03E-05	0.2199	2.27E-07
1995	Industrial 1	638444	3654021	0.02802	1.00E-01	1.06E-05	0.2199	2.32E-07
MAXIMUM	Commercial 6	638574	3654650	0.03334	1.00E-01	1.26E-05	0.2199	2.76E-07

Mr. Ron Leiken
October 29, 2008
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A copy of all of the model output files is attached as ATTACHMENT C.

Please do not hesitate to contact us if you have any questions or require any additional information.

Sincerely:

ENVIRONMENTAL MANAGEMENT ASSOCIATES, INC.

A handwritten signature in black ink, appearing to read "Dwight L. Carey". The signature is fluid and cursive, with the first name "Dwight" being the most prominent part.

Dwight L. Carey, D.Env.
Principal

Cc: Bob Sullivan - Ormat (w/ Attachments)

Attachments:

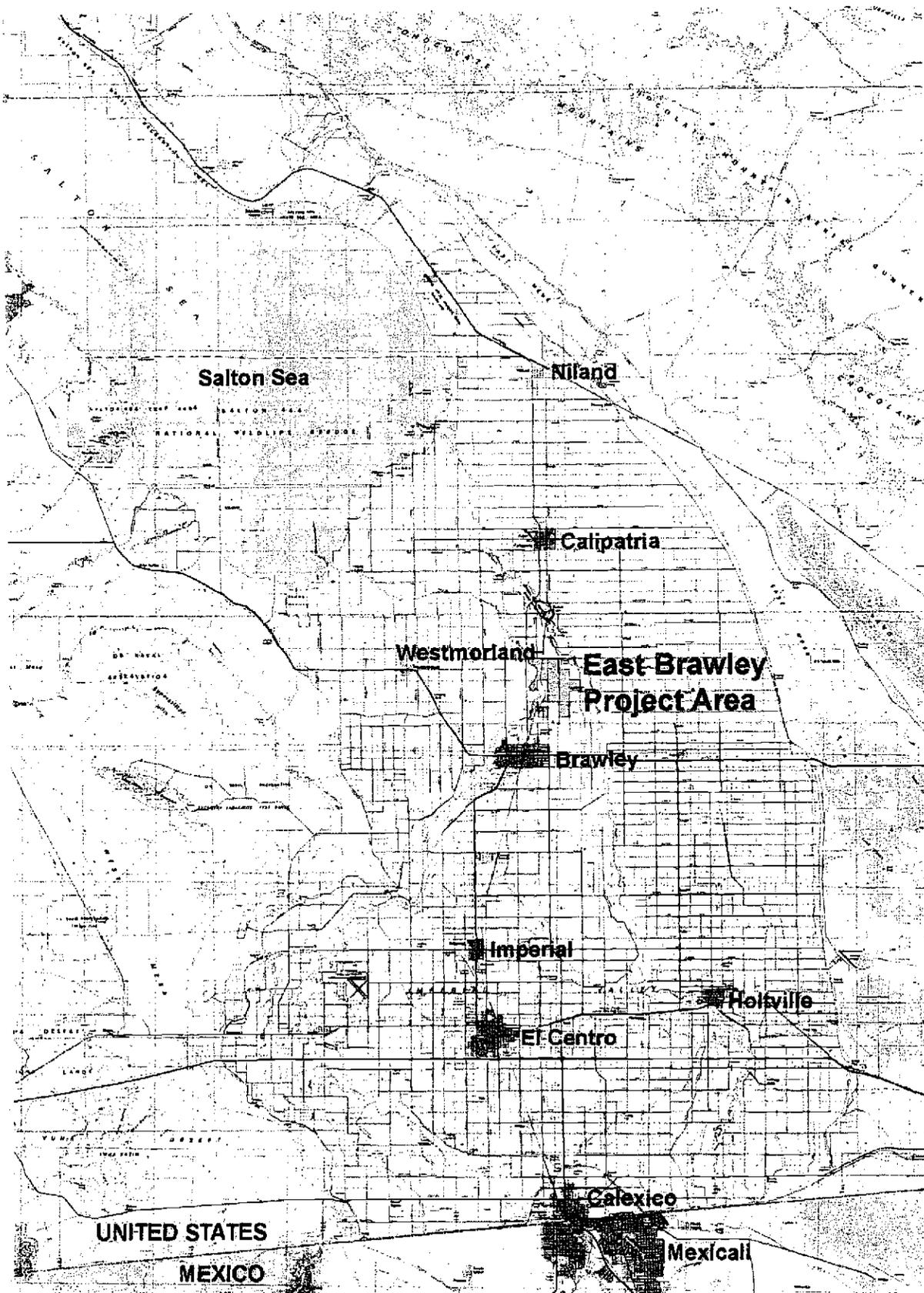


Figure 1: East Brawley Geothermal Project Location Map

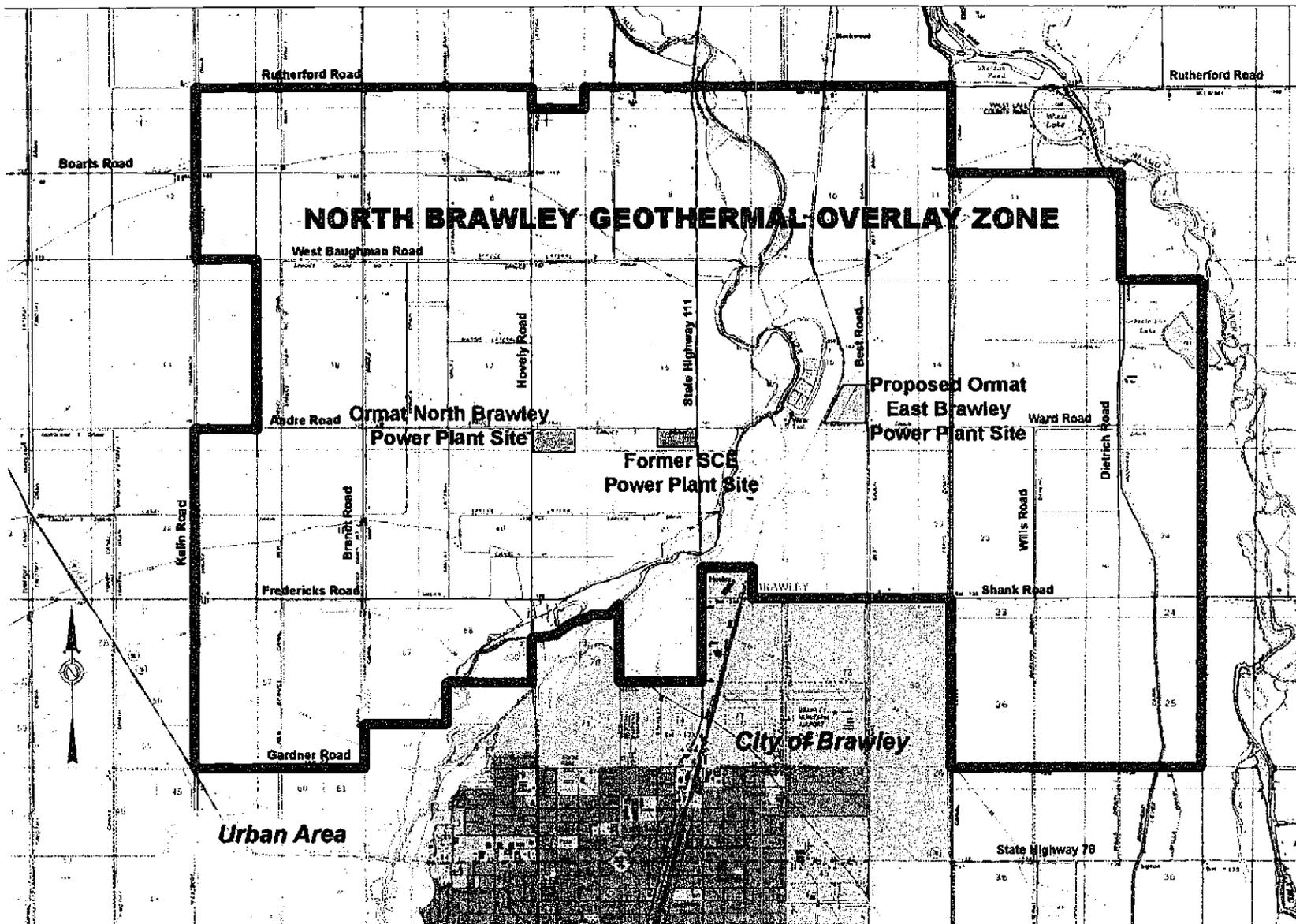


Figure 2: East Brawley Geothermal Project Power Plant Location Map

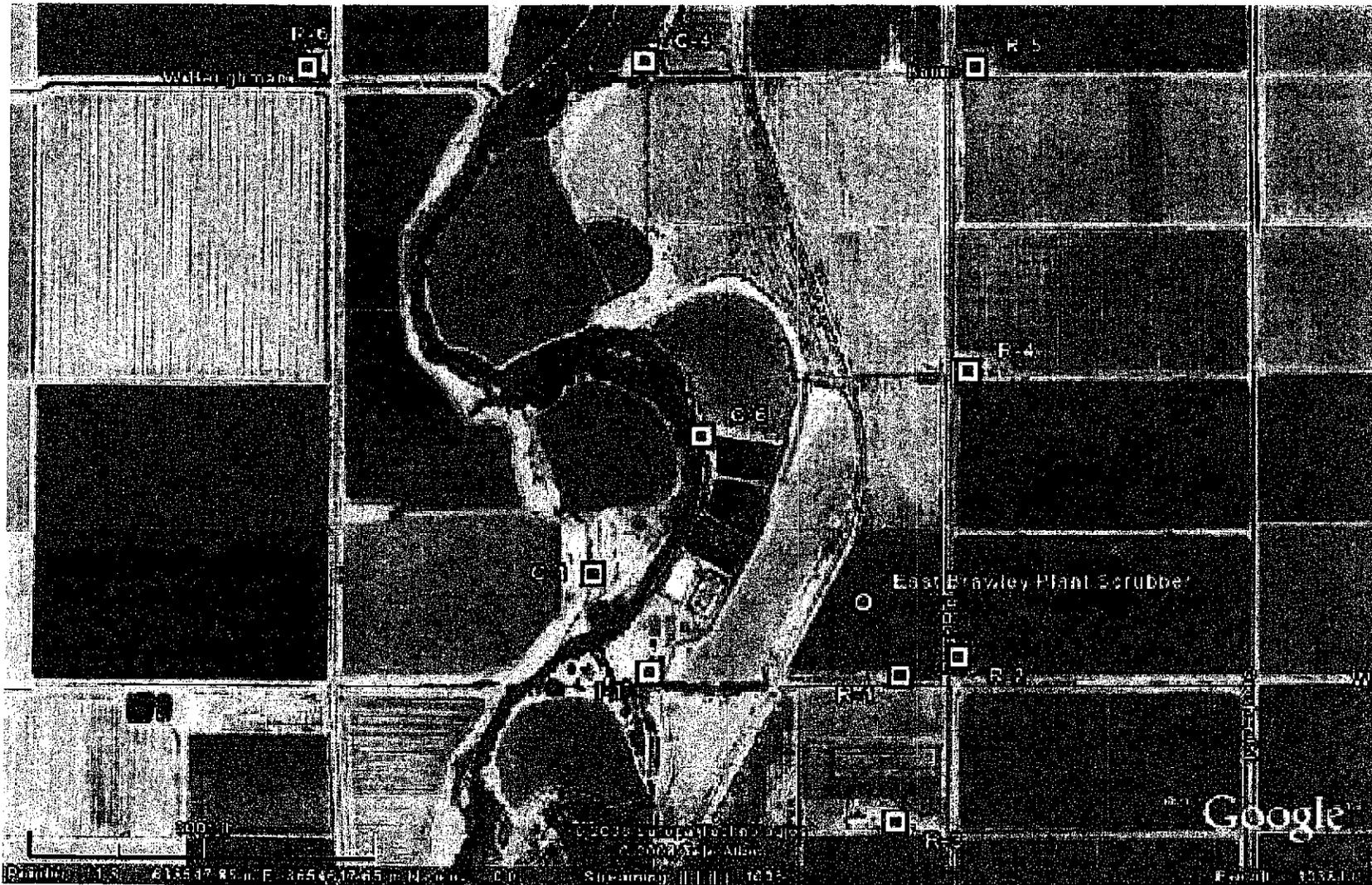
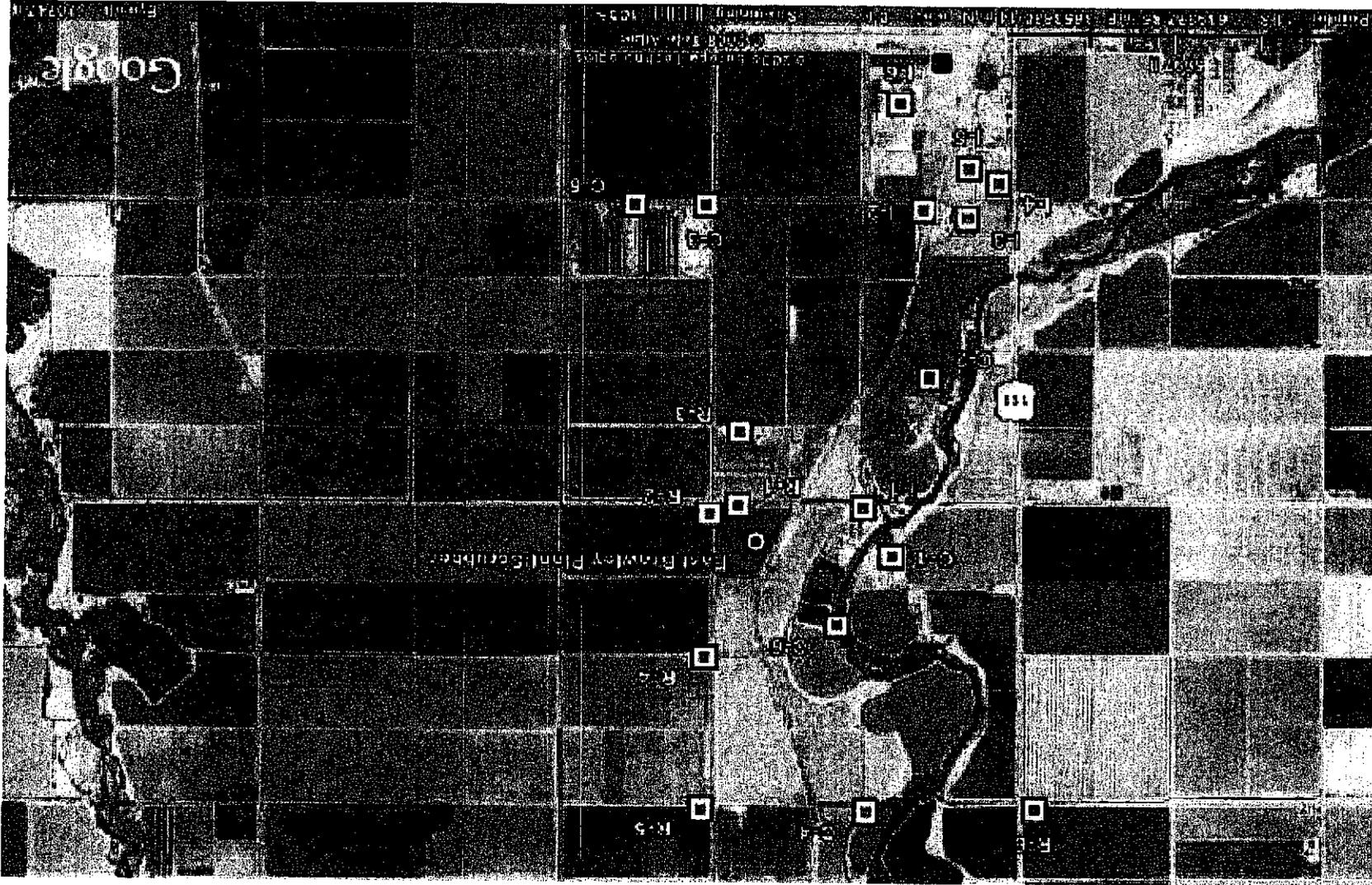


Figure 3: Existing Residences within One Mile of the East Brawley Geothermal Project

Figure 4: Existing Commercial/Industrial Sites within One Mile of the East Brawley Geothermal Project



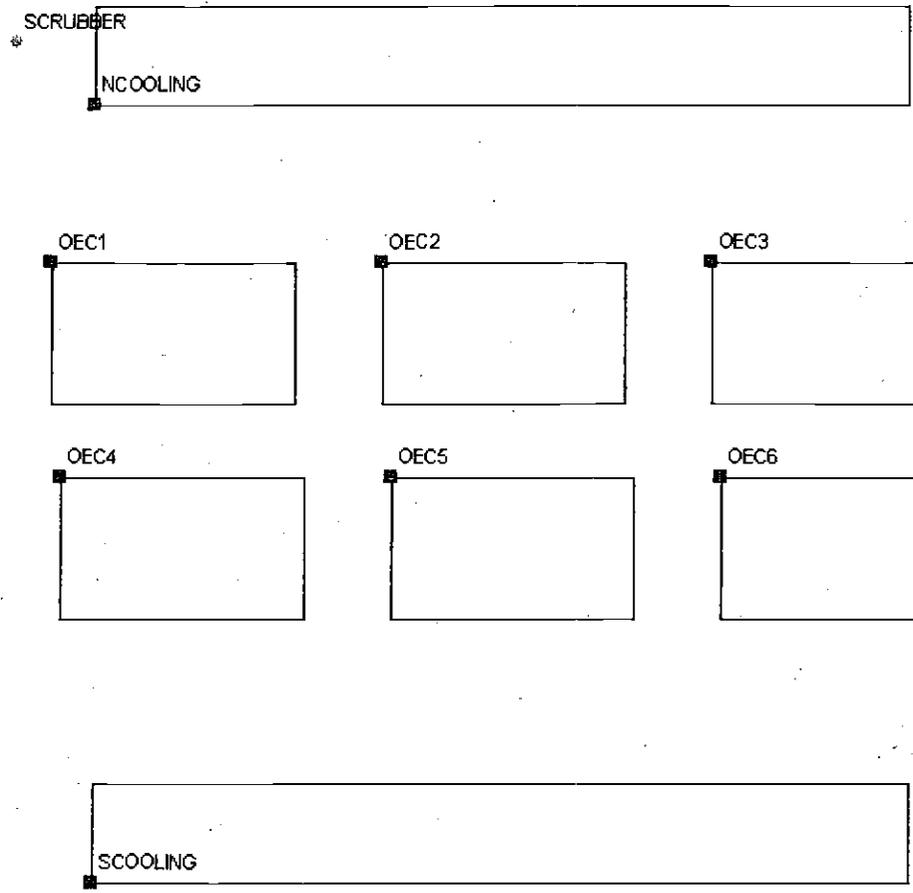
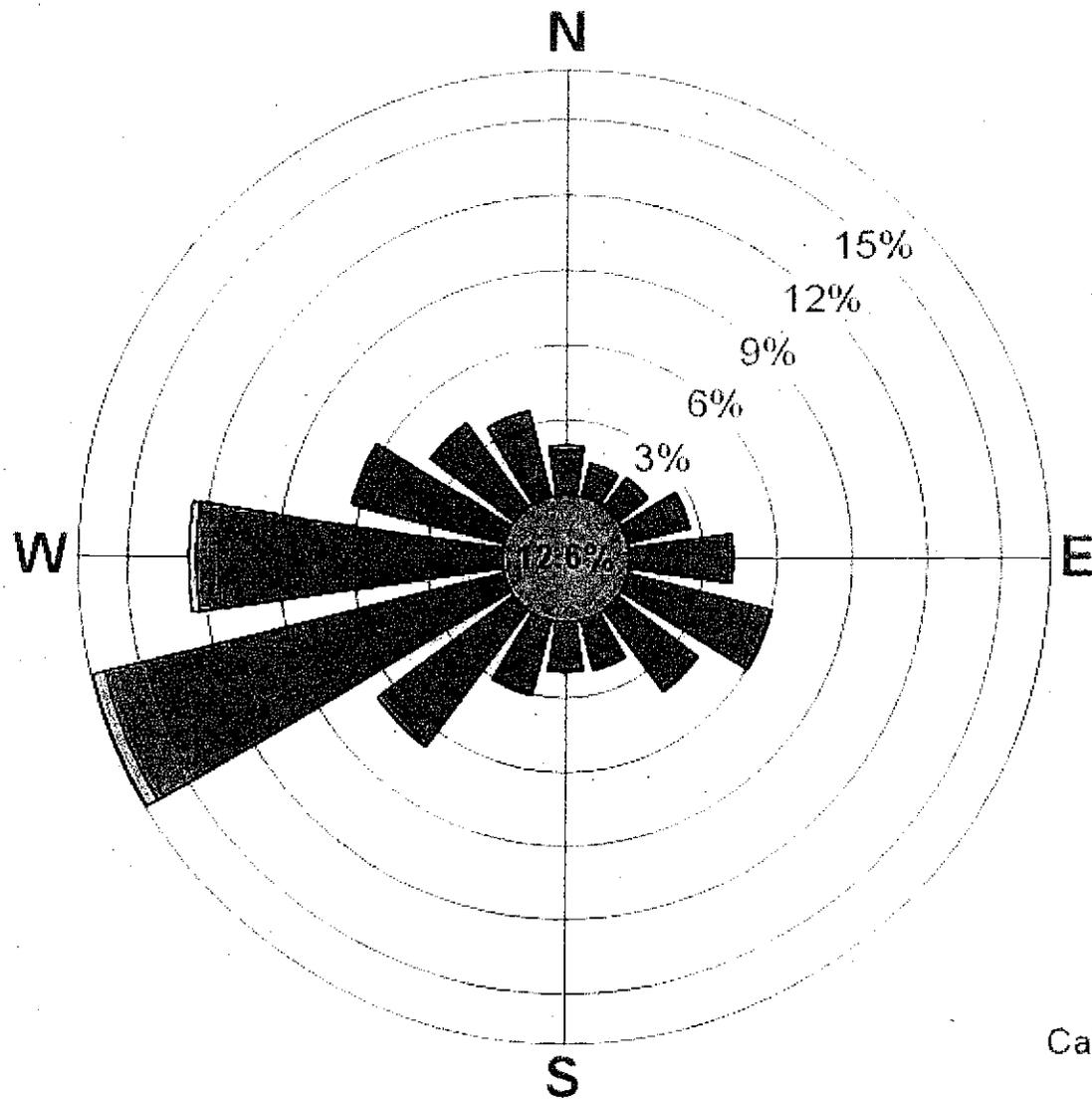
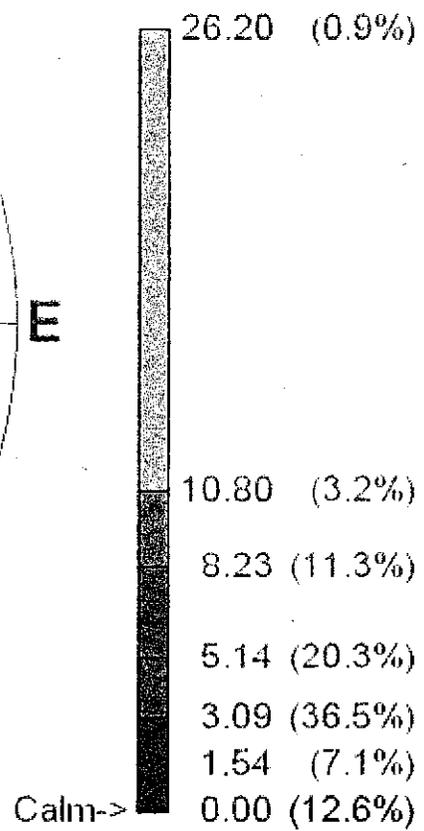


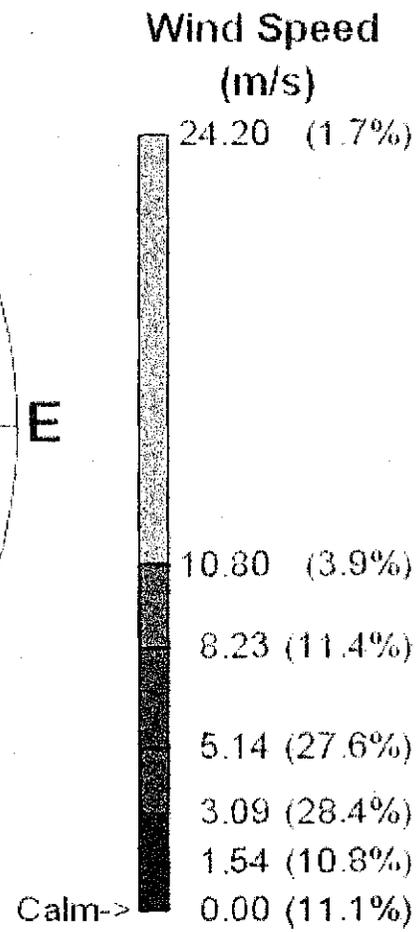
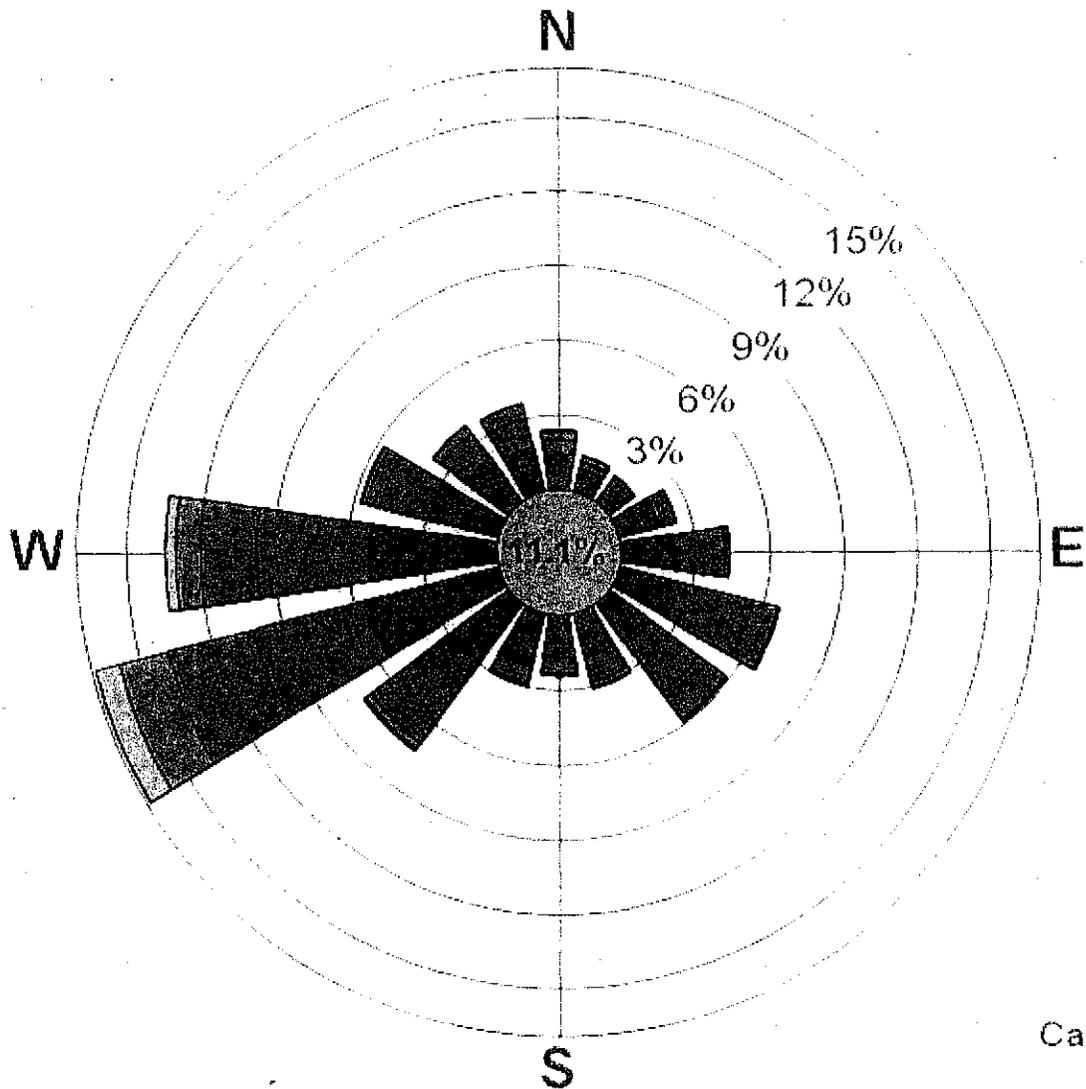
Figure 5: Facility Modeled Buildings and Emission Source (Scrubber)

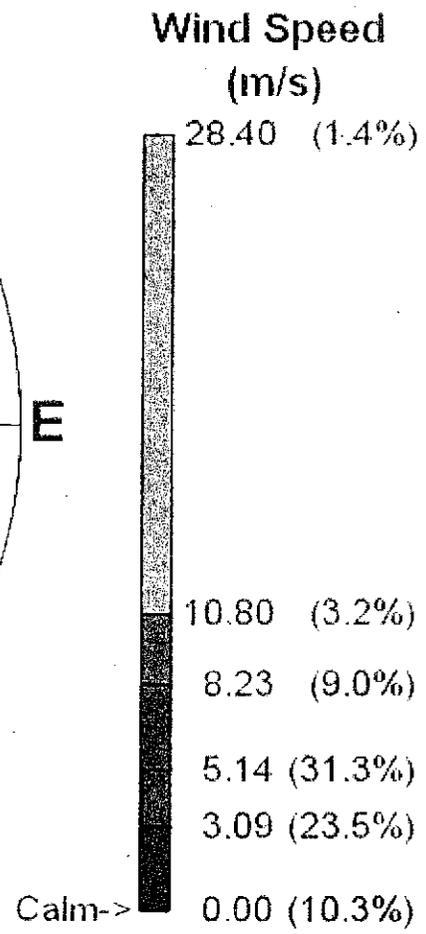
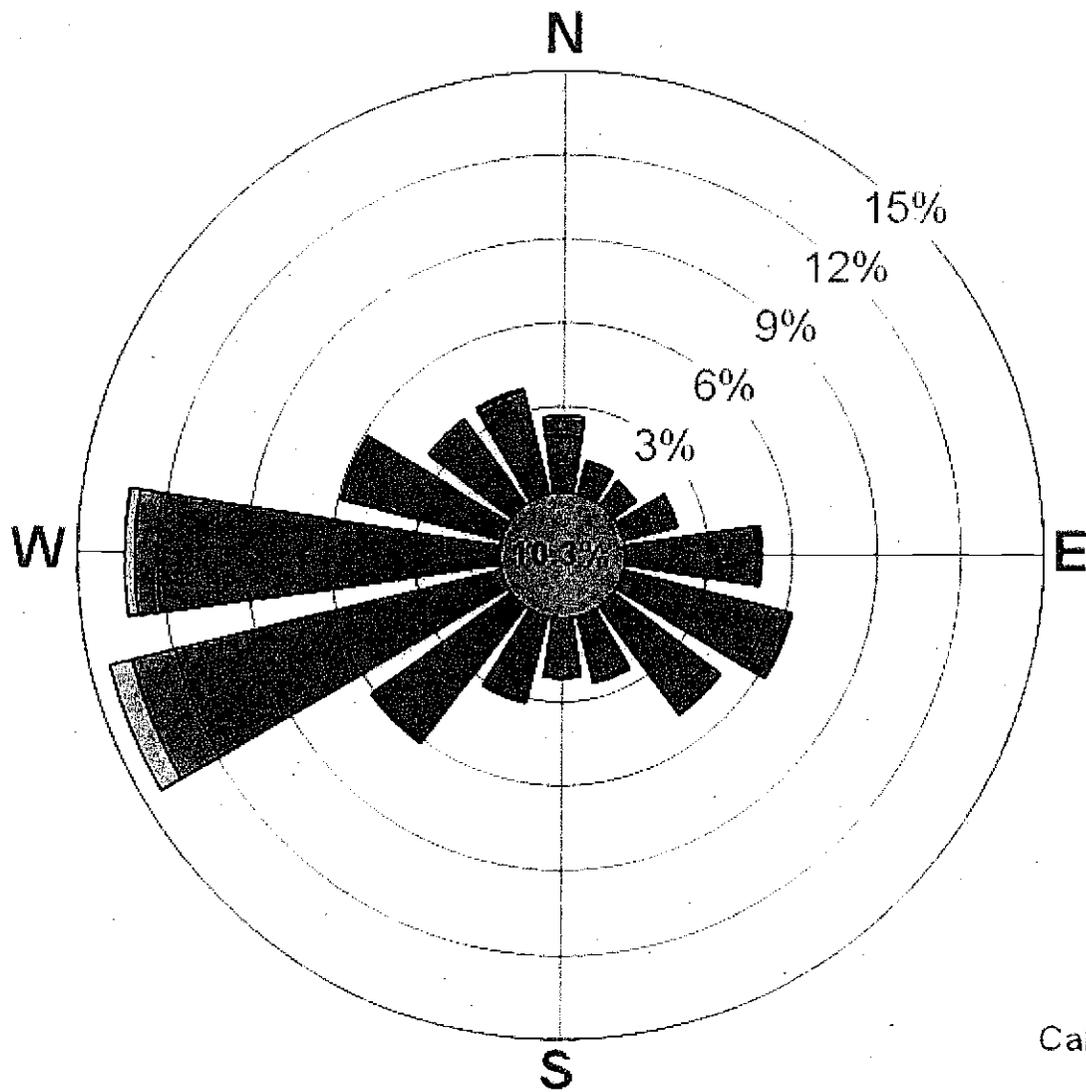
ATTACHMENT A: METEOROLOGICAL DATA WINDROSE PLOTS

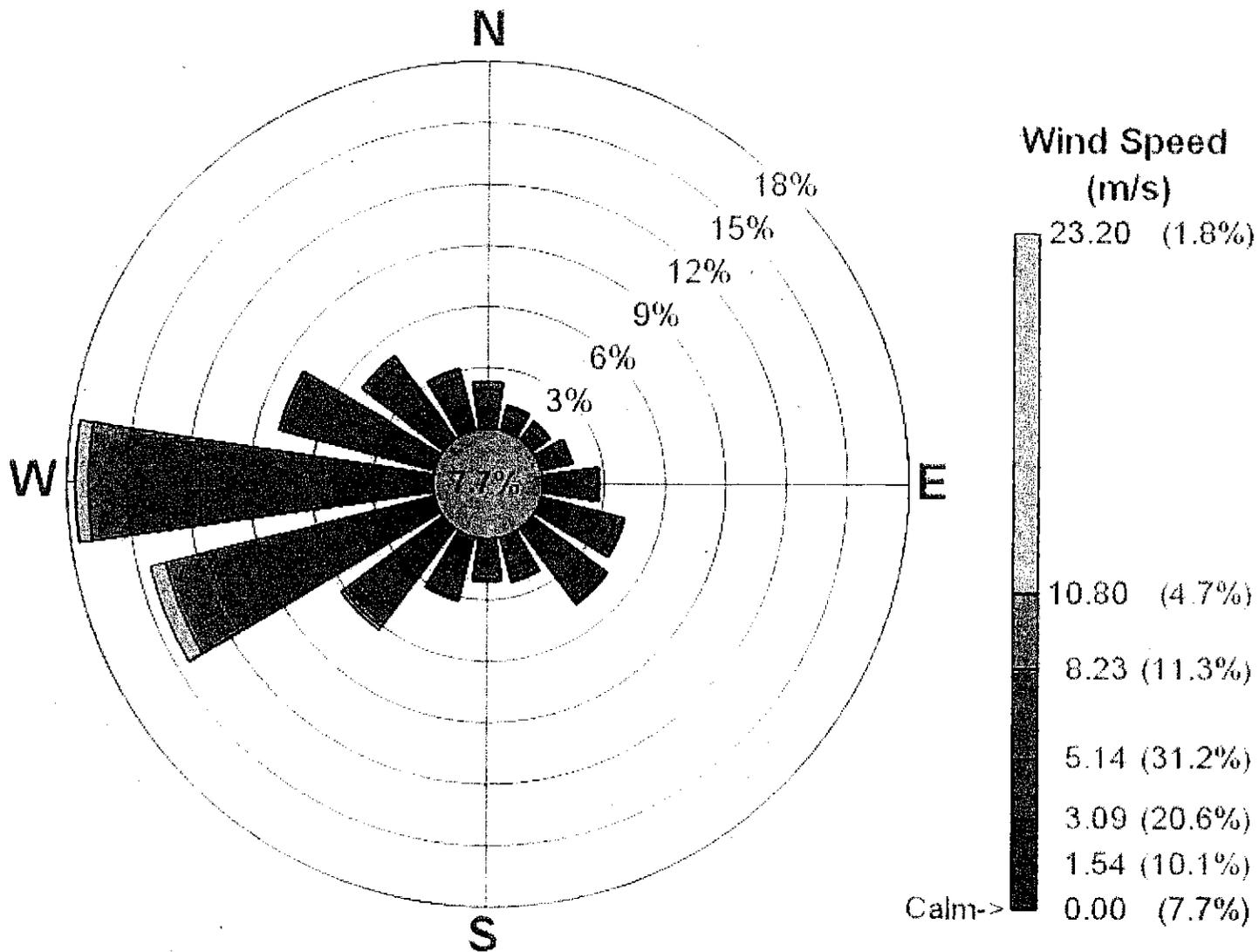


Wind Speed
(m/s)









N

18%

15%

12%

9%

6%

3%

W

E

S

ATTACHMENT B: MODELING PARAMETERS

Stack Modeling Parameters

Model ID	Description	Stack Source Modeling Parameters									
		UTM (meters - NAD83)		(feet)	C6H6	H2S	Stack Height	Stack Gas Temperature	Stack Gas Velocity	Stack Diameter	Stack Gas Flow Rate
		Easting	Northing	Elevation	(lbs/hr)	(lbs/hr)	(feet)	(F°)	(feet/sec)	(feet)	(actual cubic feet/min)
SCRUBBER	Gas Scrubber Stack Outlet (300 psig)	639012	3654210	-44.2	0.56	0.43	65.00	Ambient +20°F	20.20	0.67	423

Rectangular Building Parameters

Model ID	Description	East Brawley Rectangular Building Modeling Parameters						
		UTM (meters - NAD83)		(meters)	(feet)	(feet)	(feet)	(degrees)
		Easting	Northing	Elevation	Height	X-Length	Y-Length	Angle
NCOOLING	North Cooling Tower	639026.4	3654198.5	-44.20	54	493.00	60.00	0
SCOOILING	South Cooling Tower	639026.4	3654055.7	-44.20	54	493.00	60.00	0
OEC3	OEC Unit #3	639140.1	3654169.8	-44.20	20	85.50	147.5	90
OEC2	OEC Unit #2	639079.3	3654169.8	-44.20	20	85.50	147.5	90
OEC1	OEC Unit #	639018.5	3654169.8	-44.20	20	85.50	147.5	90
OEC4	OEC Unit #4	639020.2	3654130.2	-44.20	20	85.50	147.5	90
OEC5	OEC Unit #5	639081.0	3654130.2	-44.20	20	85.50	147.5	90

Residential Receptors

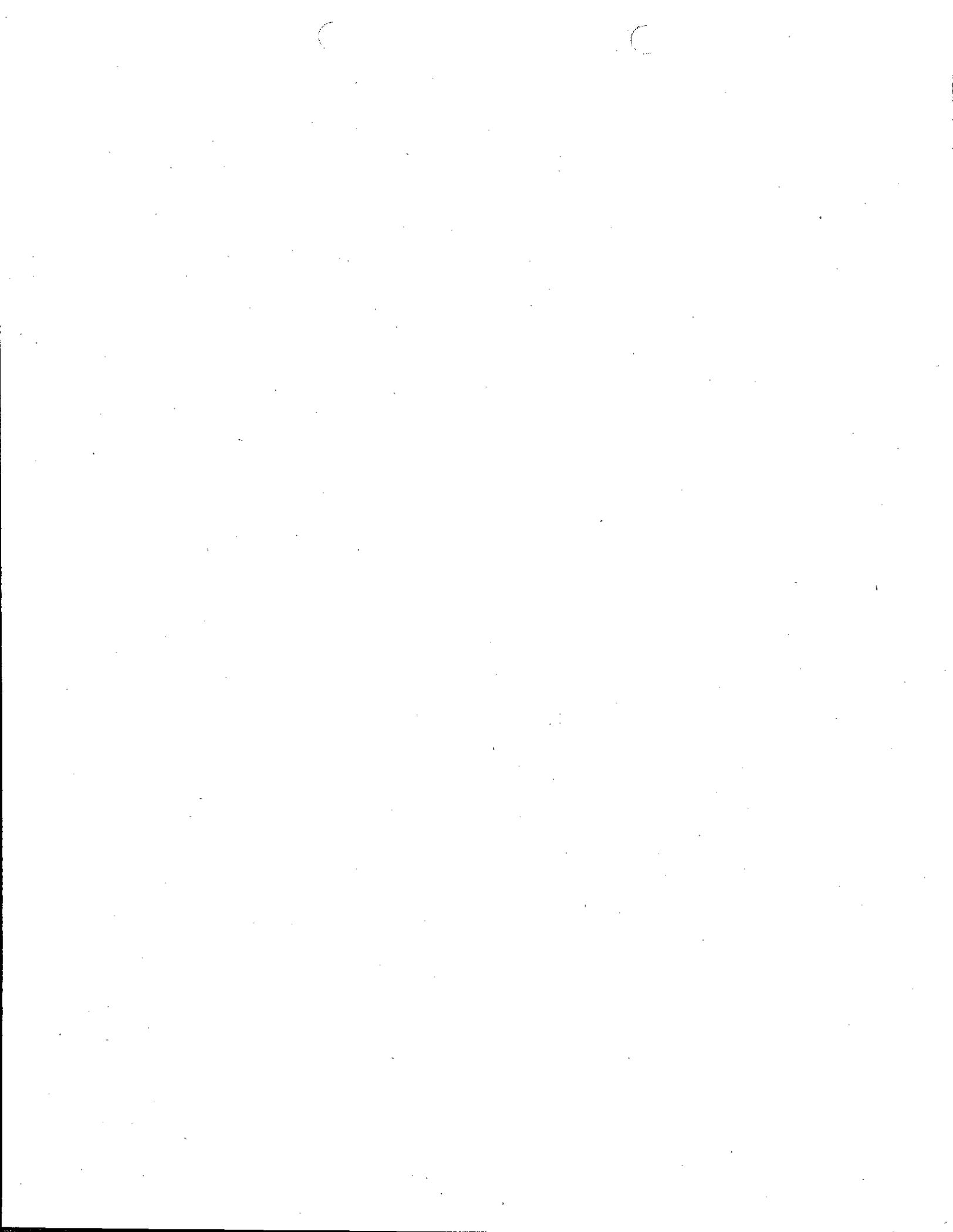
Model ID	Description	Residential Receptors		
		UTM (meters - NAD83)		(meters)
		Easting	Northing	Elevation
D1	Residence 1	639117	3654018	-43.89
D2	Residence 2	639272	3654070	-44.20
D3	Residence 3	639110	3653627	-42.67
D4	Residence 4	639287	3654828	-44.50
D5	Residence 5	639298	3655639	-45.72
D6	Residence 6	637505	3655618	-46.16

Worker Receptors

Model ID	Description	Residential Receptors		
		UTM (meters - NAD83)		(meters)
		Easting	Northing	Elevation
D7	Commercial 1	638290	3654280	-45.82
D8	Commercial 2	638099	3653322	-43.89
D9	Commercial 3	639311	3652418	-42.67
D10	Commercial 4	638409	3655645	-47.04
D11	Commercial 5	639699	3652418	-42.67
D12	Commercial 6	638574	3654650	-56.05
D13	Industrial 1	638444	3654021	-48.94
D14	Industrial 2	638151	3652430	-40.59
D15	Industrial 3	637914	3652468	-40.84
D16	Industrial 4	637750	3652280	-40.59
D17	Industrial 5	637909	3652205	-40.84
D18	Industrial 6	638280	3651863	-40.54

**ATTACHMENT C: COMPACT DISK WITH ALL MODEL INPUT AND OUTPUT
FILES**

Cultural



Summary of Native American Contact Results for the Ormat East Brawley Project

We received one response by mail from Bridgette Nash-Chrabacs of the Ft. Yuma Quechan after the report was finished. The responses from Carmen Lucas and Preston Arrow-weed were received by telephone. I think it is important to emphasize that they did not refer to any specific sites or places within the project as containing cultural resources and the record search and survey of the project area were both negative. I have worked on and I am aware of other projects where a specific geographic place (Pilot Knob, Gregory Mountain, Tecate Peak, Indian Pass/Glamis Min etc...) is associated with ceremonial functions, spiritual deities, or listed in creation myths and this is not the case with any areas within the project area, nor do I believe that was what Ms. Lucas or Mr. Arrow-weed were trying to infer. I should also note that we have done extensive ethnographic work and consultation with tribes in the valley and we have not been to find any mention of the underground snake spirit in any ethnographic literature related to the Kamia/Quechan or their oral histories and this story may be from a different group or not well known.

The tone of the conversation was related to the Imperial Valley/Colorado Desert in general rather than this specific project area. Both Ms. Lucas and Mr. Arrow-weed are distressed by the rapidly expanding rate of development in the area. I believe they see the desert region as one large continuous cultural resource and that any development destroys the landscape on a piecemeal basis. They did not have knowledge of any specific cultural resources or sacred sites within the project area but rather see the desert as sacred in its entirety.

Ms. Lucas and Mr. Arrow-weed emphasized that Native Americans lived throughout the valley and they requested monitoring to ensure that potential cultural resources would be protected regardless of prior disturbance. Given the highly disturbed nature of the project area it seems extremely unlikely that any cultural resources will be encountered and monitoring the project should be more than adequate mitigation for any potential impacts.



TIERRA

ENVIRONMENTAL SERVICES

October 29, 2008

Mr. Dave Singleton
Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, CA 95814
(916) 653-4082

Dear Mr. Singleton,

Tierra Environmental Services (Tierra) has been obtained to conduct an intensive archaeological survey of approximately 150 acres of land proposed for the construction of a Geothermal Power Plant and 60 wells and well pads in Brawley in Imperial County, California. The project area is located approximately 15 miles southeast of the Salton Sea and just northeast of Brawley, CA (Figure 1). The project area is located in various portions of Sections 2, 3, 10-16, and 21-23 Township 13 South, Range 14 East. The project area is shown on the Wiest and Westmorland East USGS 7.5' Quadrangles (Figure 2). The project area of potential effect (APE) includes approximately 150 acres.

In addition to informing you about this project, a major purpose of this letter is to request a search of the sacred lands files in possession of the NAHC. Any information you may have about cultural resources on the property would greatly benefit our study.

If I can provide any additional information, please contact me immediately at (858) 578-9064. Thank you for your assistance.

Sincerely,

Patrick McGinnis, RPA
Senior Archaeologist

Enclosures

Native American Contacts
Imperial County
November 7, 2008

La Posta Band of Mission Indians
Gwendolyn Parada, Chairperson
PO Box 1120 Diegueno
Boulevard , CA 91905
(619) 478-2113
619-478-2125

Torres-Martinez Desert Cahuilla Indians
Raymond Torres, Chairperson
PO Box 1160 Cahuilla
Thermal , CA 92274
(760) 397-0300
(760) 397-8146 Fax

Manzanita Band of Kumeyaay Nation
Leroy J. Elliott, Chairperson
PO Box 1302 Kumeyaay
Boulevard , CA 91905
(619) 766-4930
(619) 766-4957 Fax

Kumeyaay Cultural Heritage Preservation
Paul Cuero
36190 Church Road, Suite 5 Diegueno/ Kumeyaay
Campo , CA 91906
chairman@campo-nsn.gov
(619) 478-9046
(619) 478-9505
(619) 478-5818 Fax

Campo Kumeyaay Nation
Monique LaChappa, Chairperson
36190 Church Road, Suite 1 Kumeyaay
Campo , CA 91906
chairman@campo-nsn.gov
(619) 478-9046
(619) 478-5818 Fax

Kwaaymii Laguna Band of Mission Indians
Carmen Lucas
P.O. Box 775 Diegueno -
Pine Valley , CA 91962
(619) 709-4207

Ramona Band of Cahuilla Mission Indians
Joseph Hamilton, Chairman
P.O. Box 391670 Cahuilla
Anza , CA 92539
admin@ramonatribe.com
(951) 763-4105
(951) 763-4325 Fax

Ewiiapaayp Tribal Office
Michael Garcia, Vice-Chairman/EPA Director
PO Box 2250 Kumeyaay
Alpine , CA 91903-2250
michaelg@leaningrock.net
(619) 445-6315 - voice
(619) 445-9126 - fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Geothermal Power Plant and 60 Wells and Well pads; located near the City of Brawley in Imperial County, California for which a Sacred Lands File search and Native American Contacts list were requested.

Native American Contacts
Imperial County
November 7, 2008

✓ Manzanita Band of the Kumeyaay Nation
Nick Elliott, Cultural Resources Coordinator
P.O. Box 1302 Kumeyaay
Boulevard , CA 91905
(619) 766-4930
(619) 925-0952 - cell
(919) 766-4957

✓ Quenchan Indian Nation
Bridget Nash-Chrabascz, THPO
P.O. Box 1899 Quechan
Yuma , AZ 85366
b.nash@quechantribe.com
(928) 920-6068 - CELL
(760) 572-2423

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Geothermal Power Plant and 60 Wells and Well pads; located near the City of Brawley in Imperial County, California for which a Sacred Lands File search and Native American Contacts list were requested.

NATIVE AMERICAN HERITAGE COMMISSION

915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net



November 7, 2008

Mr. Patrick McGinnis, RPA, Senior Archaeologist
TIERRA ENVIRONMENTAL SERVICES
9915 Businesspark Avenue, Suite C
San Diego, CA 92131-1120

Sent by FAX to: 858-578-3646
Number of pages: 3

Re: Request for a Sacred Lands File records search and Native American Contacts list for the proposed Geothermal Power Plant and 60 Wells and Well Pads; located near the City of Brawley; Imperial County, California

Dear Mr. McGinnis:

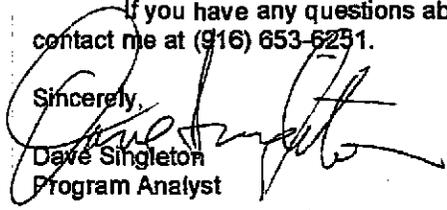
The Native American Heritage Commission (NAHC) was able to perform a record search of its Sacred Lands File (SLF) for the affected project area/area of potential effect (APE). The SLF did indicate the presence of Native American cultural resources in the immediate project area.

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Enclosed are the names of culturally affiliated Native American Contacts that may have knowledge of cultural resources in the project area. A list of Native American contacts is attached to assist you. It is advisable to contact the persons listed; if they cannot supply you with specific information about the impact on cultural resources.

Lead agencies should consider avoidance, as defined in Section 15370 of the California Environmental Quality Act (CEQA) when significant cultural resources could be affected by a project. Also, Public Resources Code Section 15064.5(f) and Section 15097.98 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery'. Discussion of these should be included in your environmental documents, as appropriate.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,


Dave Singleton
Program Analyst

Attachment: Native American Contact List

November 7, 2008

Fort Yuma Quechan Indian Nation
Mike Jackson, Sr., President
P.O. Box 1899
Yuma, AZ 85366

Mr. Jackson,

Tierra Environmental Services (Tierra) has been obtained to conduct an intensive archaeological survey of approximately 150 acres of land proposed for the construction of a Geothermal Power Plant and 60 wells and well pads in Brawley in Imperial County, California. The project area is located approximately 15 miles southeast of the Salton Sea and just northeast of Brawley, CA (Figure 1). The project area is located in various portions of Sections 2, 3, 10-16, and 21-23 Township 13 South, Range 14 East. The project area is shown on the Wiest and Westmorland East USGS 7.5' Quadrangles (Figure 2). The project area of potential effect (APE) includes approximately 150 acres. An archaeological site record and literature review has been obtained from the South Coastal Information Center at the San Diego State University.

In addition to informing you about this project, a major purpose of this letter is to request any information that you, and any tribal elders, may have regarding cultural resources located in the vicinity of the APE, pursuant to Section 106 of the NHPA. Any information you may have about cultural resources on the property would greatly benefit our study. If you or other tribal members have any knowledge about cultural resources located on the project site, please contact me. If I can provide any additional information, please contact me immediately at (858) 578-9064. Thank you for your assistance.

Sincerely,



Patrick McGinnis, RPA
Senior Archaeologist

Enclosures

**Native American Contacts
Imperial County, CA
November 7, 2008**

Cahuilla

Torres-Martinez Desert Cahuilla Indians
Raymond Torres, Chairperson
P.O. Box 1160
Thermal, CA 92274
lajolla-sherry@aol.com
(760) 397-0300
(760) 397-8146 Fax

Torres-Martinez Desert Cahuilla Indians
William J. Contreras, Cultural Resources Coordinator
P.O. Box 1160
Thermal, CA 92274
cultural_monitor@yahoo.com
(760) 397-0300
(760) 275-2686 Cell
(760) 397-8146 Fax

Augustine Band of Cahuilla Mission Indians
Karen Kupcha, Tribal Administrator
P.O. Box 846
Coachella, CA 92236
(760) 369-7171
(760) 369-7161

Diegueno

Kwaaymii Laguna Band of Mission Indians
Carmen Lucas
P.O. Box 775
Pine Valley, CA 91962
(619) 709-4207

Kumeyaay

Ewilaapaayp Tribal Office
Harlan Pinto, Sr., Chairperson
P.O. Box 2250
Alpine, CA 91903
wmicklin@leaningrock.net
(619) 445-6315
(619) 445-9126 Fax

Kumeyaay

Manzanita Band of Kumeyaay Nation
Leroy J. Elliott, Chairperson
P.O. Box 1302
Boulevard, CA 91905
council@rincontribe.org
(619) 766-4930
(619) 766-4957 Fax

Campo Kumeyaay Nation
H. Paul Cuero, Jr., Chairperson
36190 Church Road, Suite 1
Campo, CA 91906
chairgoff@aol.com
(619) 478-9046
(619) 478-5818 Fax

San Luis Rey Band of Mission Indians
Mark Mojado, Cultural Resources
1889 Sunset Drive
Vista, CA 92081
(760) 724-5805
(760) 586-4858 Cell

Manzanita Band of the Kumeyaay Nation
Nick Elliott, Cultural Resources Coordinator
P.O. Box 1302
Boulevard, CA 91905
(619) 925-0952 Cell
(619) 766-4930
(619) 766-4957

Quechan/Kumeyaay

Quechan Indian Nation
Preston Arrow-weed
P.O. Box 160
Bard, CA 92222
(760) 353-7349
(928)388-9456

Quechan

Fort Yuma Quechan Indian Nation

Mike Jackson, Sr., President

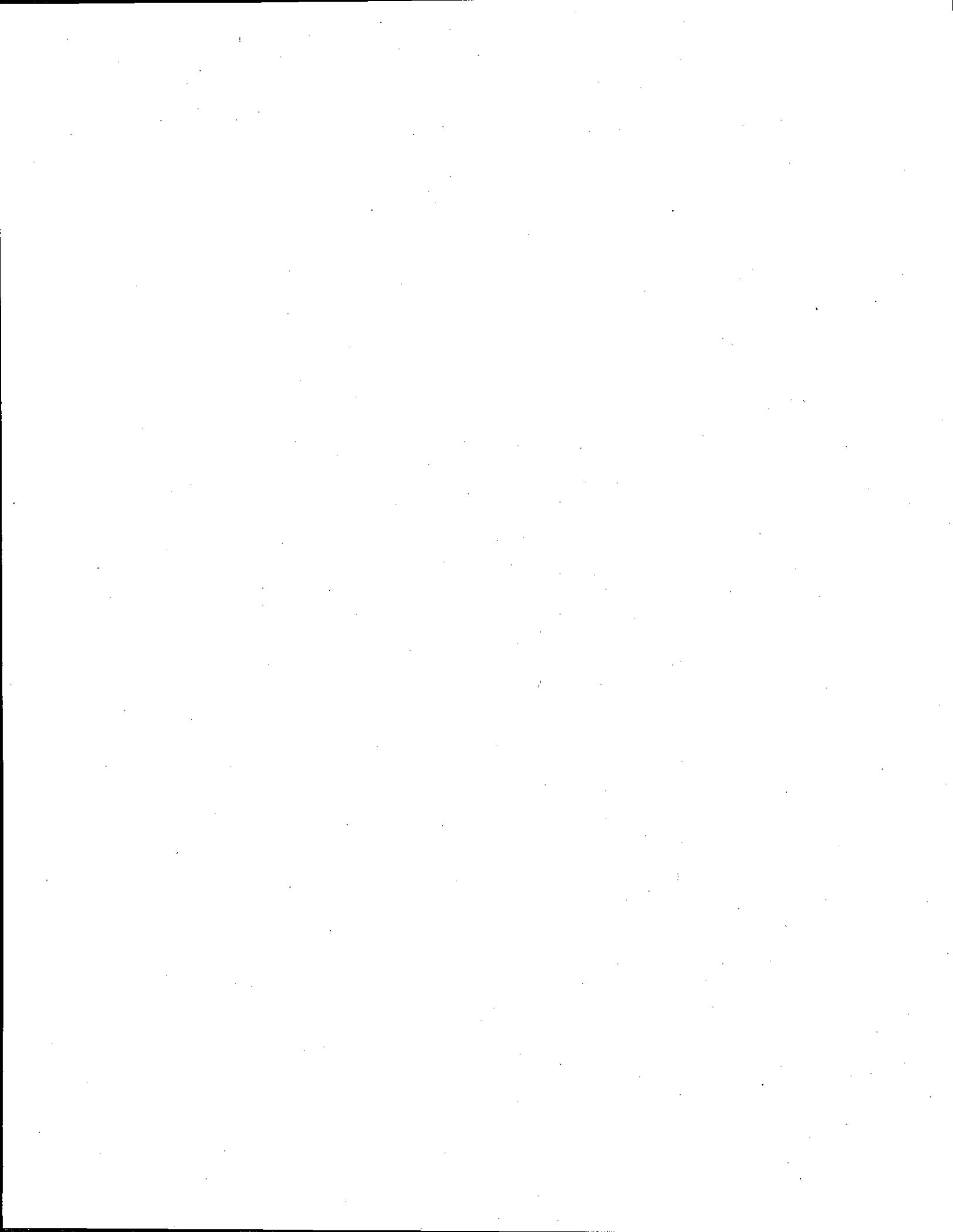
P.O. Box 1899

Yuma, AZ 85366

(760) 572-0213

(760) 572-2102 Fax

EXHIBIT 14





County of Imperial

080306

Building Roads into the Next Century

PUBLIC WORKS DEPARTMENT

January 8, 2009

Mr. Bill Darnell
Darnell & Associates, Inc.
1446 Front Street, Suite 300
San Diego, CA 92101

SUBJECT: North Brawley 2 Geothermal Development Project; Plan Check #1
Traffic Study Comment Letter, Project # 4898A

Dear Mr. Darnell:

Attached please find the first plan check comment letter, received by Public Works for the above-mentioned project. The plans were reviewed by the County's Plan Checking Consultant, W2.

Please address all redlines and return 2 set of prints with the redlines to Patrick Wong, 50 S. Delacey Avenue, Suite 100, Pasadena, CA 91105. Please also send one set directly to this Department with transmittal letter notifying of prints sent to Patrick Wong.

In addition please address the following comment:

1. Sheet A-2 & A-3 need to be removed from the traffic study. This is due to the fact that the information is not related to this project

Should you have any questions, please do not hesitate to contact Manuel Ortiz, Assistant County Engineer of this office at (760) 482-4462.

Respectfully,

William S. Brunet, P.E.
Director of Public Works

BY:

Manuel Ortiz
Assistant County Engineer

ML/dm

Cc: Jurg Heuberger, Director of Planning and Development Services

CI

155 South 11th Street, El Centro, CA 92243-2853. Tel: (760) 482-4462 • Fax: (760) 352-1272
An Equal Opportunity / Affirmative Action Employer

P:\Marnis\Plan Check Letter\North Brawley 2 Ormat Traffic Study PC 1.doc



Project Name:	<u>North Brawley 2 Geothermal Development Traffic Study</u>	Date:	<u>12/18/2008</u>
Plan Check Agency:	<u>Imperial County Public Works</u>	Plan Check No.:	<u>1</u>
Plan Checker / No.:	<u>Martin Lang / 760-482-4585</u>	Report Received:	<u>11/25/2008</u>
Job Address:	<u>Northwest corner of Best Road and Ward Road</u>	Plan Check Engineer:	<u>HL/DK</u>
	<u>North of the City of Brawley</u>	Telephone:	<u>(626) 396-9855</u>
Owner / Tel:	<u>ORN1 18, LLC/ORMAT Nevada Inc.</u>	E-mail:	<u></u>
Engineer / Tel:	<u>Bill Darnell, PE / 619-233-9373</u>	County Project No.:	<u>4898A</u>

Status:
 C = Completed I = Incomplete R = Required (Not Yet Submitted)

Traffic Engineer:
 Please fill in response below.

Project Name: North Brawley 2 Geothermal Development Traffic Study

Item No.	Page #	Description	Table / Figure	Traffic Engineer's Response	Status
1	2	Adjust "Project Site" to match with Figure 2 and Figure 4.	1		
2	6	Is the intersection at Shank Road and Best Road uncontrolled? Please identify.	4		
3	8	Define the "private pipeline easement". This easement shall be reviewed by the Public Works Department.			
4	9, 10, 11, 13, 14	Fix map. SR-11 is SR-111.	8, 7, 8, 9, 10		
5	15	The report indicates tapers are based on a 55 mph design speed. Clarify if 55 mph is the design speed or the posted speed.			
6	19	Show right of way width.	12		

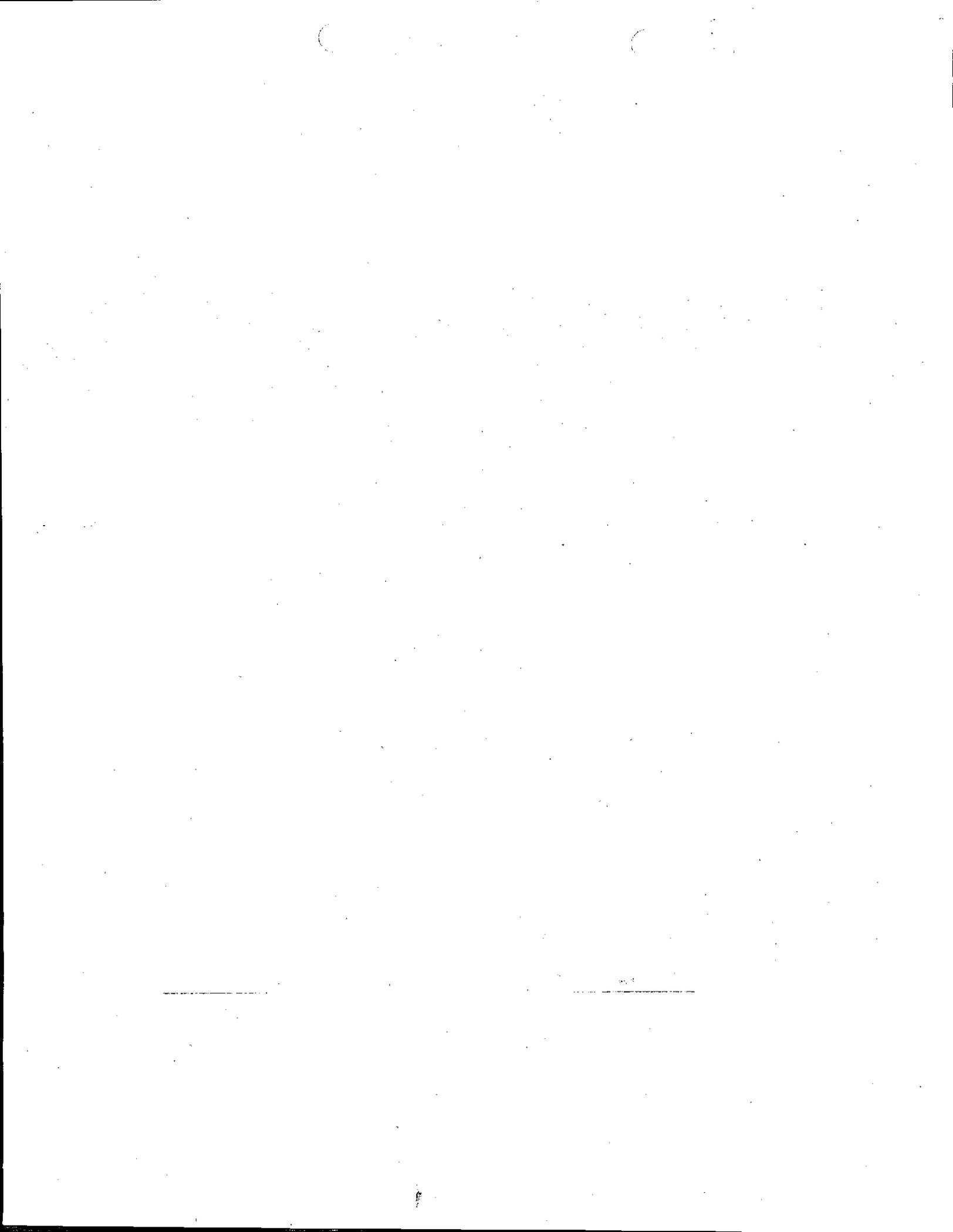
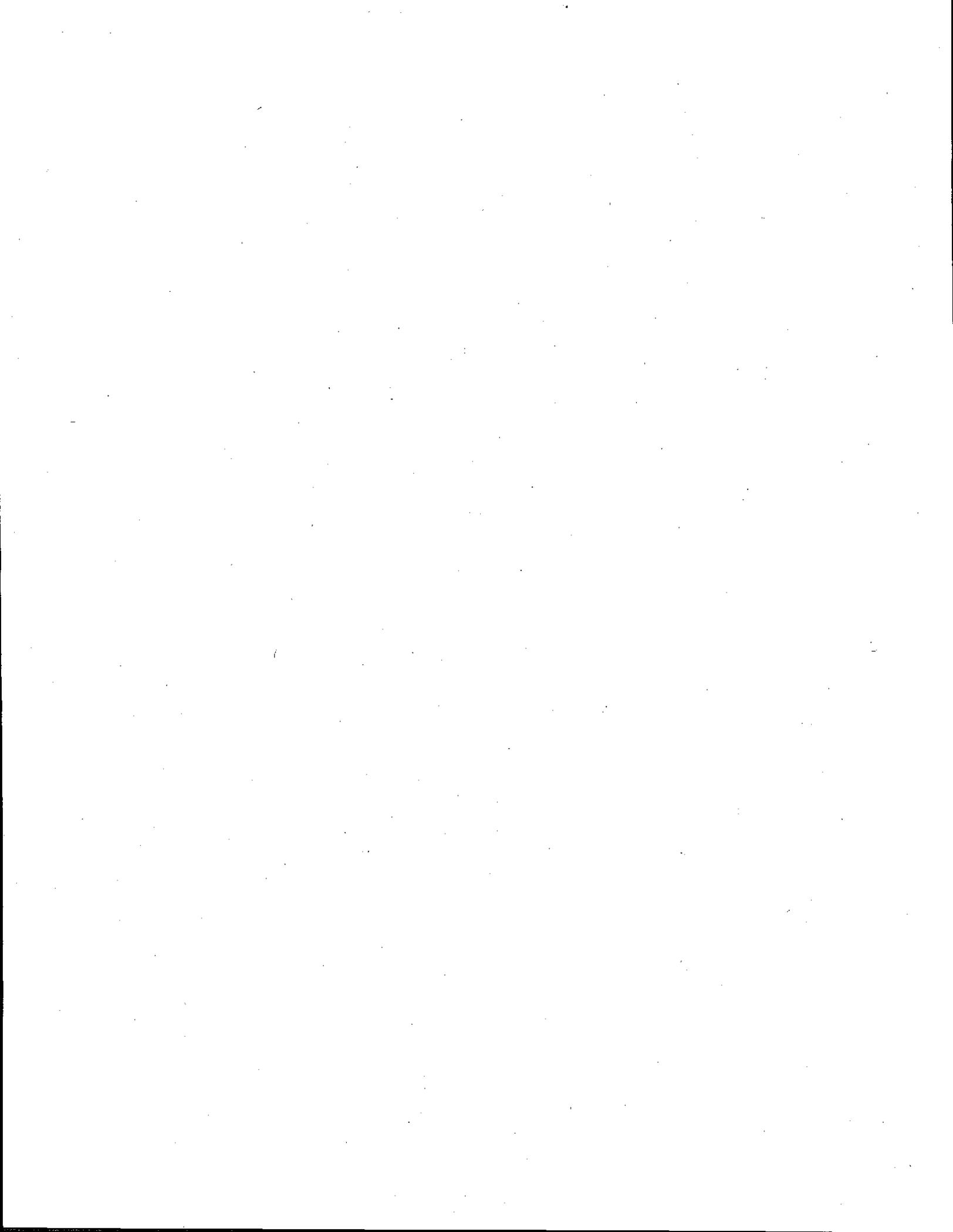


EXHIBIT 15





Department of Energy

Washington, DC 20585

JUL 15 2009

Mr. Milford Wayne Donaldson
State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942896
Sacramento, CA 94296-0001

Subject: Determination of No Effect, Ormat East Brawley Geothermal Facility

Dear Mr. Donaldson:

The Department of Energy is preparing an Environmental Assessment (EA) under the National Environmental Policy Act for guaranteeing a loan to Ormat for the development of the East Brawley Geothermal Facility. This letter is to request concurrence on a "finding of no historic properties affected" for the U.S. Geothermal project on the basis of those materials required by 10 CFR Part 800.11d (1) through (3).

1) A description of the undertaking, specifying the Federal involvement, and its area of potential effects (APE), including photographs, maps, drawings, as necessary:

The proposed project relating to the Federal loan guarantee is the construction and operation of a 30MW geothermal facility on 32 acres of land in the North Brawley Geothermal Overlay Zone, approximately 15 miles southeast of the Salton Sea in Imperial County (Figure 1). North Brawley is located 125 miles east of San Diego in Imperial County. The site is a relatively flat ground and is located in a predominantly farming area well removed from development and urban encroachment. Existing access roads (paved, graveled or dirt) would be utilized to the extent practical. Any new access required for the Project would be constructed adjacent to the edges of the agricultural fields and parallel to irrigation canals and drains that traverse the Project area. Approximately 14 miles of pipeline would be built, but no new roads would be built for pipeline construction or maintenance and pipeline construction would not require grading of the pipeline routes. Access is via State Highway 111. The Brawley East River Plant would be adjacent to the existing 50MW North Brawley Geothermal Power Plant. All infrastructure is existing with no capacity constraints.

The area of potential effect consists of 32.81 acres to be developed into a geothermal power plant and 60 additional wells, each on 2.6 acres, for a total of approximately 189-acres and associated developed roads (Figure 2). The wells would be connected to each other, and the plant facility, via a network of above-ground pipes located on the edges of existing roads.

2) A description of the steps taken to identify historic properties, including, as appropriate, efforts to seek information pursuant to Part 800.4(b);

In November 2008, a cultural resources survey was performed for the project. Please find enclosed a copy of the report entitled "A Cultural Resources Survey of 189-Acres Proposed for Geothermal Development Near Brawley, Imperial County, California" dated November 2009 and an addendum letter report dated March 17, 2009. Cultural resource work was conducted in accordance with the California Environmental Quality Act (CEQA). The County of Imperial serves as the lead agency for CEQA compliance associated with the project. The archaeological inventory includes archival and other background studies in addition



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to the field survey of the project. The archival research consisted of a literature and records search conducted for the project in addition to an examination of historic maps, and historic site inventories. This information was used to identify previously recorded resources and determine the types of resources that might occur in the survey area.

Additionally, DOE provided interested tribes with a description of the proposed project and invited them to initiate government to government consultation and share any concerns they might have regarding sites of religious and cultural significance (attached). No concerns were reported to DOE and there are no known sites of religious or cultural significance listed on or eligible for listing on the National Register of Historic Places in the immediate vicinity of the proposed project.

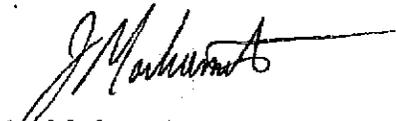
3) The basis for determining that no historic properties are present or affected.

Based on the archaeological inventory methods and procedures described above and in the attached report, no historic properties or paleontological resources were located in the area of the proposed drill site and access road [36CFR800 Section 11(d)(3)]. Therefore DOE has determined that no historic properties would be affected by the proposed project and *No Effect on Historic Properties* as defined in NHPA regulations would occur (36 CFR 800.16(b)). This finding, along with field survey results and background research are contained in the attached report "A Cultural Resources Survey of 189-acres Proposed for Geothermal Development near Brawley, Imperial County, California."

If any cultural, historic, or archaeological resources are identified during construction of the plant or associated access road, work shall be halted and a qualified archaeologist and your office will be consulted before work is resumed to evaluate the significance of the resources.

We would appreciate a concurrence on our determination of no effect. You may fax this information to me at (202) 586-7809 or mail to Joseph Marhamati, U.S. Department of Energy, CF-1.3, 1000 Independence Ave. S.W., Washington, DC 20585. You may also contact me by phone at (202) 586-8198 or via email at joseph.marhamati@hq.doe.gov if you have any questions.

Sincerely,



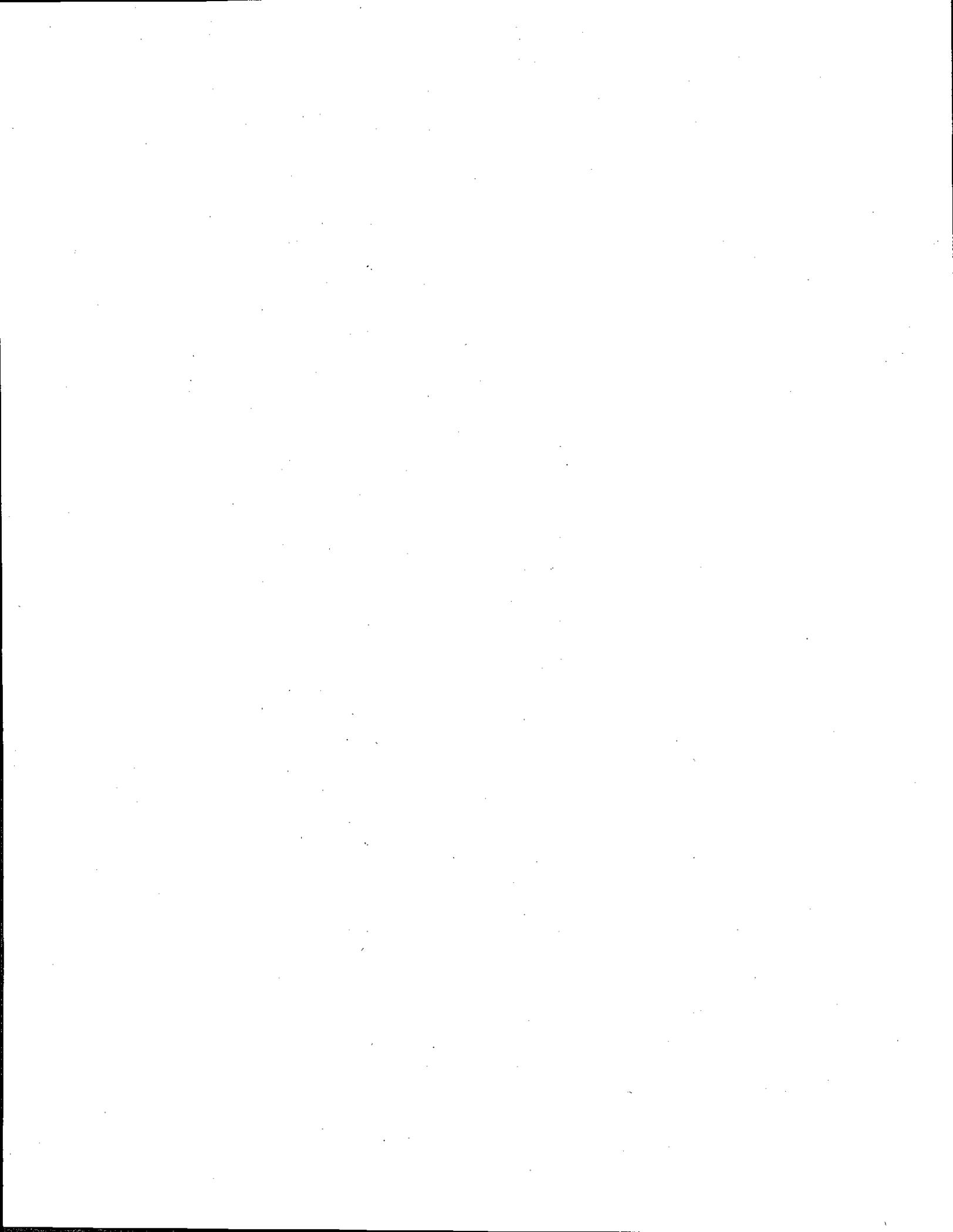
Joe Marhamati
DOE Loan Guarantee Program Office
NEPA Division

Enclosures

A Cultural Resources Survey of 189-acres Proposed for Geothermal Development near Brawley, CA
Letters to Tribes

cc: Ron Leiken, Ormat Nevada, Inc.
Patrick McGinnis, Tierra Environmental Services

EXHIBIT 16



Development

DESIGN &

ENGINEERING

RECEIVED

Date: December 3, 2009

To: Whom it may concern

From: Development Design & Engineering, Inc.
(Contact: Derek Dessert)

DEC 03 2009

IMPERIAL COUNTY
PLANNING & DEVELOPMENT SERVICES

Re: ORMAT'S Environmental Assessment of East Brawley Geothermal Development Project's (EBGDP) Potential Impact to IID Drains & Salton Sea

Executive Summary

The purpose of this evaluation is to analyze the potential environmental impacts of ORMAT'S EBGDP to IID drains and the Salton Sea. ORMAT is proposing to construct and operate the East Brawley Geothermal Development Project northeast of the City of Brawley in Imperial County, California. The proposed water use for the facility is 5,500 acre-feet / year. This is the approximate amount of water needed to irrigate 1,048 +/- acres of agricultural land in Imperial Valley based on the assumption that an average acre of agricultural land uses 5.25 acre-feet per year, which is the 2009 apportionment for water users that have eligible farmable cropland.¹ After analyzing the impacts of the EBGDP to IID drains and the Salton Sea, we determined that any potential impacts are negligible, or less than significant, for the following reasons:

- The agricultural equivalent of land that correlates with ORMAT'S proposed water use equates to approximately 0.23% of IID's irrigated acreage, an insignificant amount.
- Approximately 13% of the total irrigated acreage within the Imperial Unit is irrigated at least twice, which conveys additional water to IID drains and the Salton Sea. When compared to this additional drainage water, EBGDP's reduction to drainage water is insignificant. (2)
- Assuming the total average irrigated acreage of the Imperial Unit uses 5.25 acre-feet per acre per year; ORMAT proposes to use approximately 0.2% of all water used for agriculture in the Imperial Unit, an insignificant amount.
- ORMAT's reduction in drainage water is approximately 0.12% of the total outflow of the Salton Sea through evaporation, an insignificant amount.
- EBGDP's loss of drainage water is approximately 0.2% of the amount of drainage water generated from Imperial Unit's total average irrigated area, an insignificant amount.

The data supporting the above statements is provided in the section below.

¹ 5.25 acre-feet / acre / year is the 2009 apportionment amount approved by the IID Board of Directors on November 18, 2008; therefore, this analysis assumes it to be the annual-per-acre-water-usage for irrigable land within the Imperial Unit.

t:760.353.8110
f:760.352.6408

1065 State Street
El Centro CA 92243

info@dde-inc.net
www.dde-inc.net

Section A: Imperial Unit Irrigated Acreage

The following was taken from the Salton Sea Ecosystem Restoration Program Programmatic Environmental Impact Report (SSERPPEIR):

The IID water service area encompasses 1,061,637 acres (IID, 2005a) including 460,000 irrigated acres. Total average irrigated acres of crops are over 520,000 acres/year due to multiple cropping efforts on the same land.²

Based on the above-mentioned information, the agricultural equivalent of land that correlates with ORMAT's proposed water use (1,048 +/- acres) equates to approximately 0.23% of IID's irrigated area (approximately 460,000 acres). As IID's drainage conveyed to the Salton Sea is analyzed environmentally due to a reduction in the quantity of water used for agricultural purposes as development occurs, it is necessary to also consider increased drainage conveyed to the Salton Sea due to multiple cropping efforts per year on the same land. Based on the above-mentioned information from the SSERPPEIR, approximately 60,000 acres or 13% of the approximately 460,000 irrigated acres is being irrigated at least twice annually for agricultural purposes, thus conveying additional water to IID drains and the Salton Sea than compared to single irrigation efforts on such land. When the extra drainage water generated as a result of multiple cropping efforts per year on the same land is compared to the reduction in drainage water conveyed to District drains and the Salton Sea as an effect of the EBGDP, the result is clear that ORMAT's impact is insignificant. Under the assumption that the total average annual irrigated acreage (approximately 520,000 acres) of the Imperial Unit uses 5.25 acre-feet per acre per year, which equals 2,730,000 acre-feet per year, ORMAT is proposing to use 5,500 acre-feet per year or approximately 0.2% of the water used for agricultural production in the Imperial Unit.

Section B: Percentage of Conveyance to IID Drains and the Salton Sea / Evaporation

According to the SSERPPEIR the following is mentioned in regard to the quantity of drainage water conveyed to the Salton Sea:

Of the water delivered for on-farm use, 66 percent is used by crops, 3 percent is lost to evaporation from soil or water surfaces, 29 percent is captured in the drains as tailwater and tilewater that flows in the New and Alamo rivers or Salton Sea, and 2 percent seeps into the shallow groundwater and eventually flows into the Salton Sea.³

Under the above projection, 29% of approximately 5,500 acre-feet per year (approximately 1,595 acre-feet per year) would no longer be conveyed to IID drains and the Salton Sea based on ORMAT's proposed water use for the EBGDP.

² Salton Sea Ecosystem Restoration Program Draft Programmatic Environmental Impact Report, pg. 5-10.

³ Salton Sea Ecosystem Restoration Program Draft Programmatic Environmental Impact Report, pg. 5-10.

According to the SSERPPEIR, the following was stated regarding water inflow and outflow at the Salton Sea:

The estimated total average inflow to the Salton Sea, not including precipitation directly on the water surface, for the 1950 to 2002 period is estimated at 1,296,023 acre-feet/year with a minimum of 1,145,991 acre-feet/year in 1992 and a maximum of 1,464,736 in 1953. In recent years the total inflow has been about 1,300,000 acre-feet/year. The total outflow (through evaporation) for the historic period is estimated at 1,294,124 acre-feet/year⁴

Upon comparison of the 1,595 +/- acre-feet per year that would no longer be conveyed to the Salton Sea as a result of project development with 1,294,124 acre-feet per year as the above-mentioned Salton Sea outflow through evaporation, it is apparent that 1,595 +/- is insignificant. 1,595 +/- acre-feet is equivalent to approximately 0.12% of the annual water that evaporates at the Salton Sea. According to the SSERPPEIR, "Evaporation is the single largest hydrologic component in the Salton Sea water budget and the largest outflow factor."⁵ When 29% of the previously determined usage of 2,730,00 acre-feet per year for the Imperial Unit as well as ORMAT's projected use of 5,500 acre-feet per year are taken and compared, the result is EBGDP's loss of drainage water is 0.2 % of the amount of drainage water generated from Imperial Unit's total average irrigated area.

⁴ Salton Sea Ecosystem Restoration Program Draft Programmatic Environmental Impact Report, pg. 5-17, 18.

⁵ Salton Sea Ecosystem Restoration Program Draft Programmatic Environmental Impact Report, pg. 5-17.

760.353.8110
760.352.6408

1065 State Street
El Centro, CA 92243

info@dde-inc.net
www.dde-inc.net

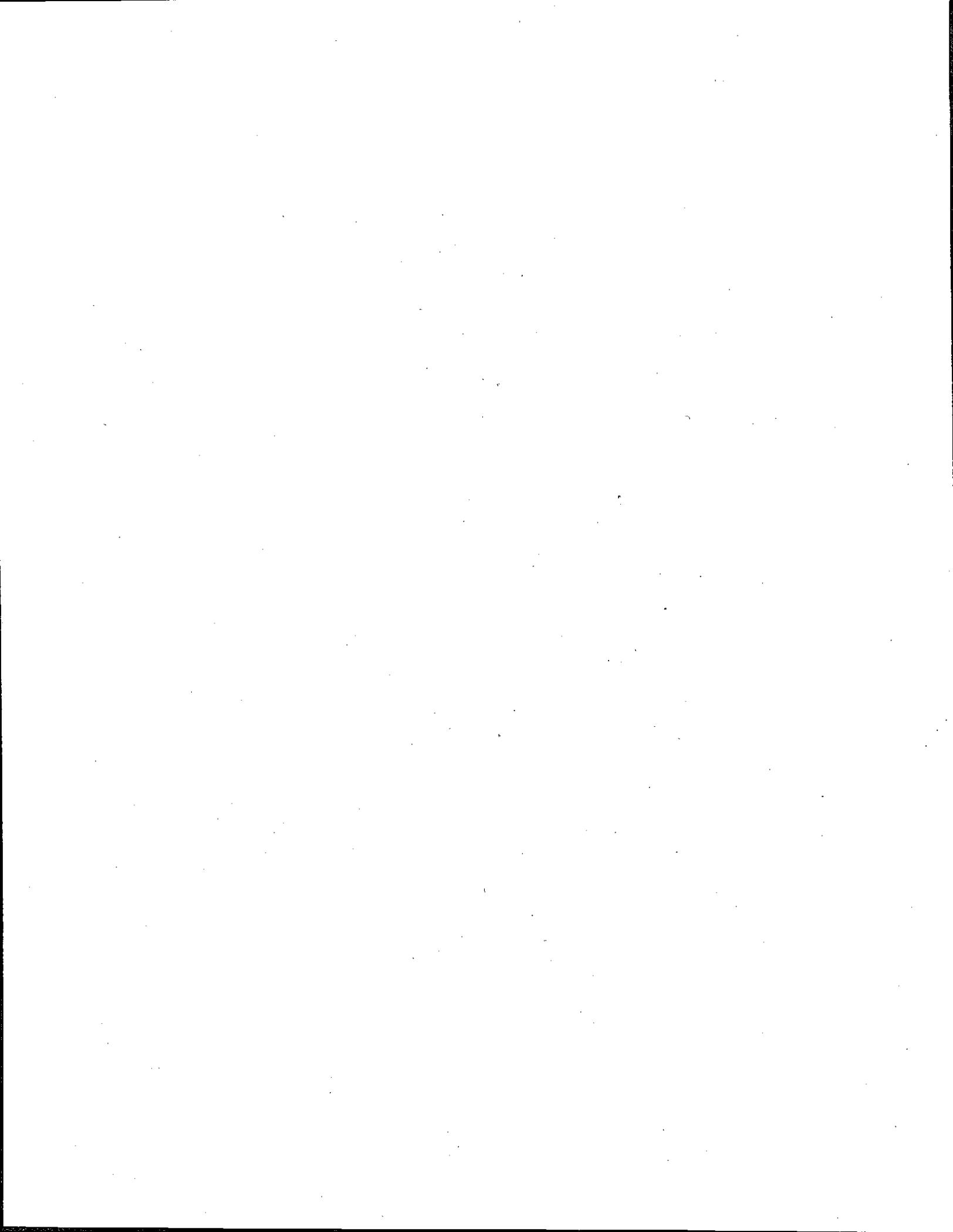


EXHIBIT 17

Angelina Havens

From: Jim Minnick
Sent: Thursday, December 10, 2009 4:45 PM
To: Jurg Heuberger
Cc: Darrell Gardner; Angelina Havens
Subject: Ormat EEC hearing

Jurg,

The project received an EIR for water and biological impacts. We worked through the checklist (2+hours) made several modifications, but could not come to an accord with water and biological impacts. The City Manager of Brawely discussed the MOU, and the IID Donald Vargus spoke. We made several attempts to get Ormat to continue the hearing, even explaining to them the consequence to the outstanding PSI's but they wanted the process completed. The EEC voted 5-0 for an EIR.

The applicant then asked about the EIR process and wanted to select and hire the EIR consultant themselves. I explained the county policy.

They have indicated that they do not want to appeal the EEC and would like to processed with the RFP process, I told them that we will need a letter to that effect.

Jim Minnick
Planning Division Manager
Imperial County
Planning & Development Services Department
801 Main Street
El Centro, CA 92243

Ph: (760) 482-4236
Fax: (760) 353-8338

Jimminnick@co.imperial.ca.us

EXHIBIT 18



PROJECT REPORT

TO: ENVIRONMENTAL EVALUATION COMMITTEE

AGENDA DATE December 10, 2009

FROM: Planning & Development Services Dept. AGENDA TIME 1:30 PM No. 1

PROJECT TYPE: ORNI 19, LLC/ Ormat Nevada./ CUP #08-0023 SUPERVISOR DIST. 4

Geothermal #09-0002

LOCATION: 5045 Best Road, APN'S: See attached various
Brawley, CA PARCEL SIZE: 32.81 + well sites

GENERAL PLAN (existing) Agriculture GENERAL PLAN (proposed) N/A

ZONE (existing) A-2-G ZONE (proposed) N/A

GENERAL PLAN FINDINGS CONSISTENT INCONSISTENT MAY BE/FINDINGS

PLANNING COMMISSION DECISION: HEARING DATE: _____
 APPROVED DENIED OTHER

PLANNING DIRECTORS DECISION: HEARING DATE: _____
 APPROVED DENIED OTHER

ENVIROMENTAL EVALUATION COMMITTEE DECISION: HEARING DATE: 12/10/2009
I.S. NUMBER 08-0035

NEGATIVE DECLARATION MITIGATED NEG. DECLARATION EIR

DEPARTMENTAL REPORTS / APPROVALS:

PUBLIC WORKS	<input type="checkbox"/>	NONE	<input checked="" type="checkbox"/>	ATTACHED
AG / APCD	<input checked="" type="checkbox"/>	NONE	<input type="checkbox"/>	ATTACHED
E.H.S.	<input checked="" type="checkbox"/>	NONE	<input type="checkbox"/>	ATTACHED
FIRE / OES	<input type="checkbox"/>	NONE	<input checked="" type="checkbox"/>	ATTACHED
OTHER	<u>see attached</u>			

REQUESTED ACTION:

SEE ATTACHED

ENVIRONMENTAL CHECKLIST

- 1. **Project Title:** CUP #08-0023 – Geothermal Facility **Date:** December 10, 2009
- 2. **Lead Agency:** Imperial County (Planning & Development Services Department)
- 3. **Contact Person:** Angelina Havens, Planner II
- 4. **Address:** 801 Main Street, El Centro, CA 92243
- 5. **Phone Number:** (760) 482-4236, extension 4984
- 6. **Project Location:** (Various – See Attached)
- 7. **Project Sponsor:** Ormat Nevada, Inc.
- 8. **Sponsor’s Address:** 6225 Neil Road, Suite 300, Reno, NV 89511
- 9. **General Plan Designation:** The County General Plan (Nov. 6, 1993 & as amended) designates this area as “Agriculture”
- 10. **Zoning:** A-2-G (General Agriculture/Geothermal)
- 11. **Description of Project:** (See Page 3)
- 12. **Surrounding Land Uses and Setting:** (See Attached)
- 13. **Other Agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)**
 - a) Planning Commission
 - b) _____
 - c) _____
 - d) _____
 - e) _____

Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a potentially Significant Impact as indicated by the checklist on the following pages.

- Aesthetics
- Biological Resources
- Hazards & Hazardous Materials
- Mineral Resources
- Public Services
- Utilities and Service and Systems
- Agriculture Resources
- Cultural Resources
- Hydrology/Water Quality
- Noise
- Recreation
- Mandatory Findings of Significance
- Air Quality
- Geology / Soils
- Land Use & Planning
- Population & Housing
- Transportation / Traffic

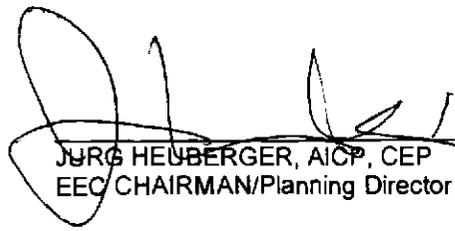
E. E. C. DETERMINATION

After Review of the Initial Study, the Environmental Evaluation Committee has:

- 1) Found that the proposed project COULD NOT have significant effect on the environmental, and a NEGATIVE DECLARATION will be prepared.
- 2) Found that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A MITIGATED NEGATIVE DECLARATION will be prepared.
- 3) Found that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is Required.
- 4) Found that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets, an ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- 5) Found that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION, pursuant to applicable standard and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

CALIF. DEPARTMENT OF FISH AND GAME
DE MINIMIS IMPACT FINDING Y N

			<u>VOTE:</u>			
			YES	NO	ABS	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	Public Works
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	EHS
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	OES
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	APCD
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	Planning

 12-10-09
 JURG HEUBERGER, AICP, CEP DATE
 EEC CHAIRMAN/Planning Director

PROJECT SUMMARY

LOCATION:

The East Brawley Geothermal Power Plant will be located on private agricultural lands in the southeast corner of Section 15, Township 13, Range 14 East, SBB&M identified by assessor's Parcel Number 037-140-006-000, with a size of 32.81 acres.

The well fields will be located along Baum Road on the north, Groshen Road on the East and the New River on the west exempting that portion where the pipeline crossing will occur to connect via pipeline to proposed wells 14-15 and 15-15. The wells would each occupy approximately 2.6 acres of farmland or approximately 88.4 total acres. There will be approximately 34 total wells (amendment 9-4-09 reduced from 60 wells), and will be used approximately half for production and half for injection. These sites include those parcels identified in Sections 10, 11, 14, 15, 16, 21, 22 and 23, Township 13 South, Range 14 East, San Bernardino Base and Meridian.

Additionally, the project will include a Pipeline Crossing over the New River. It will be located on private land (APN 037-140-002-000). Several pipes from geothermal pads on the east side of New River will be extended across the New River. The river at the crossing will be approximately 12 feet wide and begins at the end of a private road on each side of the river.

The Project boundary includes Shank Road to the South, just north of the City of Brawley's boundary within their "sphere of influence" and just north of the in-construction Highway 111 Brawley Bypass. The western boundary of the Project is east of the New River with the exception of the New River Crossing point. The northern boundary is along Baum Road and the East boundary is Groshen Road. The majority of the project is along Best Road from Shank Road to Baum Road.

The properties are also identified as Assessor's Parcel Numbers

037-090-006-000
037-100- 007, 006, 005, 004, 003, 001-000
037-110-004, 005, 007, 009, 015, 016-000
037-120-030, 031-000
037-140-001, 002, 005, 006, 009, 013, 014, 015, 016-000
037-150-015, 016, 019-000
037-160-016, 017, 027, 047-000
037-180-009, 011-000

THE PROJECT:

ORNI 19, LLC/Ormat Nevada Inc. proposes to permit, construct, operate and maintain the East Brawley Geothermal Development Project that would consist of the following facilities.

- A 49.9 net MW geothermal power plant consisting of up to six (6) OEC binary generation units (12.5 MW gross each) with vaporizers, turbines, generators, condensers, pre-heaters, pumps and piping, motive fluid (isopentene) storage, a motive fluid vapor recovery system, a gas scrubber and a regenerative thermal oxidizer (RTO) and related equipment.
- Two cooling batteries
- A control room ³⁴
- Approximately 60 total wells, averaging 4500 in depth and 2 ½ acres in size
- Piping from production wells to the power plant and from the power plant to the injection wells.
- Blow-down wells
- Pumps, tanks, valves, controls, flow monitoring, and all necessary equipment.
- Piping, canals, ditches and pumps to bring water from IID's Rockwood Canal to power plant.
- A substation and communication tower

The amount of water for the cooling systems would require **6200 acre feet per year**, additional water for road grading, construction and dust control from adjacent IID canals under the District's acquisition requirements will also be needed.

As of to date the Project has not secured a ~~contract~~ for water to serve the Project from the Imperial Irrigation District or the City of Brawley.

GENERAL PLAN ANALYSIS:

The General Plan designates this area as "Agriculture" and zoned "A-2-G" (General Agriculture/Geothermal Overlay) and is considered consistent with the County General Plan, Geothermal/Alternative Energy/Transmission Element, and the Land Use Ordinance with the approval of a Conditional Use Permit.

PROJECT LOCATION MAP

Project Location

Power Plant Location

RUTHERFORD ROAD

HWY 111

BEST ROAD

DIETRICH ROAD

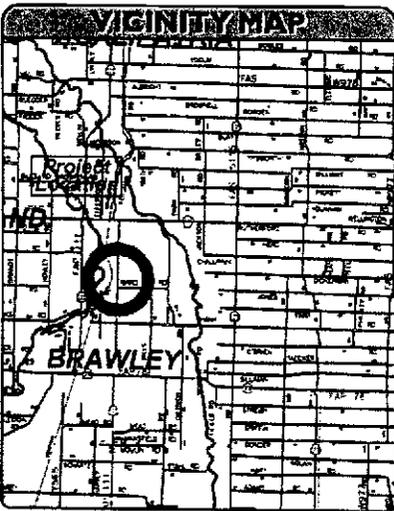
WARD ROAD

WILLS ROAD

COUNTY OF IMPERIAL

SHANK ROAD

CITY OF BRANLEY



PLANNING & DEVELOPMENT SERVICES DEPARTMENT

801 MAIN ST., EL CENTRO, CA 92243
(760) 492-4236 FAX: (760) 353-8338

Orni 19, LLC/Ormat Nevada Inc.
CONDITIONAL USE PERMIT #08-0023
APN #037-090-006-000 et al

SEE ORIGINAL



- 1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
- 2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
- 3) Once the lead agency has determined that a particular physical impact may occur then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect is significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.
- 4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).
- 5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the follow:
 - a) Earlier Analysis Used. Identify and state where they are available for review.
 - b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
 - c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures, which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
- 6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
- 7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
- 8) This is only a suggested form, and lead agencies are free to use different formats; however lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
- 9) The explanation of each issue should identify:
 - a) The significance criteria or threshold, if any, used to evaluate each question; and

The mitigation measure identified, if any, to reduce the impact to less than significance.

OFFICIAL CHECKLIST:

<i>Potentially Significant Impact (PSI)</i>	<i>Potentially Significant Unless Mitigation Incorporated (PSUMI)</i>	<i>Less Than Significant Impact (LTSI)</i>	<i>No Impact (NI)</i>
---	---	--	-------------------------------

	(PSI)	(PSUMI)	(LTSI)	(NI)
I. AESTHETICS -- Would the project:				
a) Have a substantial adverse effect on a scenic vista or scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially damage scenic resources, including, but limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
II. AGRICULTURE RESOURCES -- In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to the following determinations. Would the Project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

- | | (PSI) | (PSUMI) | (LTSI) | (NI) |
|---|--------------------------|--------------------------|-------------------------------------|--------------------------|
| c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| d) Expose sensitive receptors to substantial pollutants concentrations? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| e) Create objectionable odors affecting a substantial number of people? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

IV. BIOLOGICAL RESOURCES -- Would the project:

- | | | | | |
|--|-------------------------------------|--------------------------|-------------------------------------|-------------------------------------|
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e) Conflict with any local policies or ordinances Protecting biological resource, such as a tree preservation policy or ordinance? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

	(PSI)	(PSUMI)	(LTSI)	(NI)
V. CULTURAL RESOURCES -- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VI. GEOLOGY AND SOILS -- Would the project:				
a) Expose people or structures to potential substantial adverse effects, including risk of loss, injury, or death involving:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Strong Seismic ground shaking?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslides, lateral spreading, subsidence, liquefaction or collapse?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Be located on expansive soil, as defined of the latest Uniform Building Code, creating substantial risk to life or property?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

	(PSI)	(PSUMI)	(LTSI)	(NI)
VII. HAZARDS AND HAZARDOUS MATERIALS -- Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VIII. HYDROLOGY AND WATER QUALITY -- Would the project:				
a) Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	(PSI)	(PSUMI)	(LTSI)	(NI)

- | | | | | |
|--|--------------------------|--------------------------|-------------------------------------|-------------------------------------|
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| d) Substantially alter the existing drainage patterns of the site, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| e) Create or contribute runoff water, which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| f) Otherwise substantially degrade water quality? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| g) Place housing within a 100-year flood hazard area as mapped on a Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| h) Place within a 100-year flood area structures which would impede or redirect the flood flows? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| i) Expose people or structures to a significant risk of loss injury or death involving flooding, including flooding as a result of the failure of a levee or dam? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| j) Inundation by seiche, tsunami, or mudflow? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

IX. LAND USE AND PLANNING -- Would the project:

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| a) Physically divide an established community? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (include, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c) Conflict with any applicable habitat conservation plan or natural community conservation plan? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

	(PSI)	(PSUMI)	(LTSI)	(NI)
X. MINERAL RESOURCES -- Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
XI. NOISE -- Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) For a project located within an airport land use plan or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
XII. POPULATION AND HOUSING -- Would the project:				
a) Induce substantial population growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (for example through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

5-0 EEC 12/10/09

Correction

EEC 12/10/09

XIII. PUBLIC SERVICES

- a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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- 1) Fire protection?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------	--------------------------
- 2) Police protection?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------
- 3) Schools?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	--------------------------	-------------------------------------
- 4) Parks?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	--------------------------	--------------------------	-------------------------------------
- 5) Other public facilities?

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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XIV. RECREATION

- a) Would the project increase the use of the existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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- b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse effect on the environment?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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XV. TRANSPORTATION / TRAFFIC -- Would the project:

- a) Cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads or congestion at intersections)?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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- b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion/management agency for designated roads or highways?

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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- c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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	(PSI)	(PSUMI)	(LTSI)	(NI)
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Result in inadequate emergency access	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Result in insufficient parking capacity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Conflicts with adopted policies, plans, programs, supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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XVI. UTILITIES AND SERVICE SYSTEMS -- Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Require or result in the construction of new water or water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Be served by a landfill with sufficient permitted capacity to accommodate the project' solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Comply with federal, state, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

XVII. MANDATORY FINDINGS OF SIGNIFICANCE.

(TO BE COMPLETED BY THE EEC AT THE HEARING)

	(PSI)	(PSUMI)	(LTSI)	(NI)
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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CHECKLIST ANSWERS:**I: Aesthetics (a,b) NI**

The proposed project will not have a substantial adverse effect on a scenic vista as there are no scenic vistas in the Project area. The proposed project does not appear that it will substantially damage scenic resources, including, but not limited to trees, rock outcropping, and historic buildings within a state scenic highway.

I: Aesthetics (c,d) PSUMI

The periodic use of drill rigs in the well field would be visible from SR 111 and secondary paved roads at foreground or middle ground distances while drilling from any of the well sites in the Project area. During flow testing geothermal steam and water vapor plumes up to several hundred feet high could also be visible from the roads and nearby communities. However drilling operations would be temporary and short term.

During power plant operations cooling towers, the tallest facilities on the power plant site, would be up to 65' feet above the ground surface. This does provide a large industrial operation view and a more severe agricultural landscape which can be viewed as aesthetically blight.

Site construction of the plant activities would be conducted during the day and would not intrude any sources of nighttime light. The power plant operation will occur 24 hours per day/ seven days a week. Light sources may be produced since drilling and flow testing activities would be conducted 24 hours per day at the drill sites. The light from the drill sites would be focused downwards however the light may be still be directly visible at substantial distances. As such, the proposed project may create a substantial source of light or glare which may adversely affect nighttime views in the area.

Mitigation:

The proposed project would have to be consistent with the guidelines and regulation outlined in both the County's Land Use Ordinance and General Plan. The project will include appropriate design measures, including landscaping techniques and open space that appear to ensure impacts to be less than significant with mitigation.

II: Agricultural Resources (a,c) LTSI

The proposed project proposes to convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use. The construction of the well pads would disturb approximately 150 acres of prime farmland (), taking it out of production for the life of the project (20 - 30 years) Approximately 18 miles or either single pipeline or combined production and injection pipeline route would be built. However, the disturbed lands,

except for possibly the power plant site, would be returned to agriculture use once the wells were abandoned, the pipeline removed and the well pads reclaimed. As Such the Project would not convert to non-agricultural use any prime farmland, unque farmland or farmland of statewide imporatance.

The well sites, production and injection, would each occupy approximately 2.6 acres of farmland over the life of the project. If the wells are not successful than the disturbed sites will be restored to approximate pre- Project conditions. In the long term the project would not adversely affect the agricultural potential of lands or involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use

Additionally the Imperial County General Plan, Land Use Element, Implementation Programs and Policies, Agriculture, states:

"No land shall be removed from the Agriculture category except for annexation to a city, where needed for use by a public agency, or for geothermal purposes..."

Therefore the project can be found consistent with the Land Use Ordinances and Regulation.

II: Agricultural Resources **(b)** **NI**

The proposed project will not conflict with existing zoning for agricultural use, or a Williamson Act contract. The project does not have any parcels enrolled in Williamson Act Contracts.

III: Air Quality **(a-e)** **LTSI**

The Project would have negligible potential to conflict with or obstruct the implementation of the applicable state or ICAPCD air quality plans. California's State Implementation Plans (SIPs) are a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, state regulations and federal controls describing how the state will attain national ambient air quality standards (NAAQS) for ozone and PM₁₀. State law makes the California Air Resources Board (CARB) the lead agency for all purposes related to the SIP. Local air districts, including the ICAPCD, prepare SIP elements and submit them to CARB for review and approval. Generally, project compliance with all of the ICAPCD rules and regulations results in conformance with the state and ICAPCD air quality plans.

The Project has prepared and submitted applications to the ICAPCD for permits (Authorities to Construct) for the Project power plant and production wells and injection wells which document how the Project would comply with all the applicable ICAPCD rules, regulations and requirements for controlling emissions of the non-attainment air pollutants and their precursors.

According to the Air Quality Analysis prepared by Environmental Management Associated, Inc. on October 30, 2008 the Project daily potential to emit fine particulate matter (PM10) and reactive organic compounds (ROCs) are excess of 25 pounds, and require the implementation of best available control technology (BACT) in the form of high efficiency drift eliminator for the cooling towers, vapor recovery units (VRUs) for the OEC Units, and a scrubbing and injection system for control of the benzene (and hydrogen sulfide) in the geothermal noncondensable gases. The scrubbing and injection system for control of the benzene in the geothermal noncondensable gases is also considered T-BACT for these emissions. The project daily emissions of ROCs are also in excess of 137 pounds per day and require the purchase of about 0.77 tons per quarter of ROC offsets.

The study also made the following determination:

The Project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. Air quality modeling conducted for the Project documents that the power plant emissions of hydrogen sulfide from the scrubber stack would not produce hydrogen sulfide concentrations in excess of the state ambient air quality standard at any occupied residence.

The Project would also not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). Construction of the power plant, pipelines and wells would produce fugitive dust from surface disturbing activities and regulated air pollutants emissions, principally from diesel-powered equipment, worker vehicles and delivery trucks. ICAPCD Rule 800-805 (Fugitive Dust Requirements for Control of Fine Particulate Matter (PM10)) regulate fugitive dust emissions from construction and earthmoving activities, from carry out and track out, from open areas, and paved and unpaved roads. If necessary, Ormat would revise its current dust control plan and provide 10-day advance notice to the ICAPCD. During construction Ormat would apply BACT to limit dust emissions (such as watering the construction area at least twice a day; increasing watering frequency when winds exceed 15 mph; limiting vehicular speed to 15 mph on dirt roads and areas; and using gravel ramps at road entrances). After construction fugitive dust from open areas would be controlled through application and maintenance of water or dust suppressant(s) to all unvegetated areas, establishing vegetation on previously disturbed areas, or paving, applying and maintaining gravel, or applying and maintaining chemical stabilizers/suppressants.

The OEC Unit working fluid (isopentane) is classified as an ozone precursor and the Project's average daily emissions of isopentane would be limited to 137 pounds or subject to the ICAPCD offset requirements. The OEC Vapor Recovery Units (VRUs) at the Gould 2 power plant at Heber 2 that Ormat operates in the Heber KGRA just south of the township of Heber have demonstrated better than 99.6% efficiency in controlling and recovering isopentane emissions during normal operations. Isopentane emissions occurring during major OEC Unit maintenance activities would be controlled and minimized by evacuating and compressing the isopentane vapors, returning the

isopentane liquid to the OEC Unit and releasing the isopentane vapors which do not condense through the isopentane VRU, which would adsorb nearly all of the remaining isopentane vapors.

Based on these findings made by Environmental Management Associated, Inc. the Project's impacts to air appear to be less than significant

Additionally, the Global Warming Solutions Act of 2006 requires that by 2020 the state's greenhouse gas emissions be reduced to 1990 levels, a roughly 25% reduction under business as usual estimates. The California Air Resource Board, under the California Environmental Protection Agency, is to prepare plans to achieve the objectives stated in the Act. As defined in the bill, "greenhouse gases" include all of the following gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). These are the same gases listed as Greenhouse Gases (GHGs) in the Kyoto Protocol. The diesel drilling rig engines may generate limited quantities of greenhouse gas emissions.

IV: Biological Resources (a-e) PSI

The Salton Sea is a critical component of the habitat base that currently sustains migratory birds of the Pacific Flyway. Wetland losses within the state of California exceed 90 percent of the acreage present at the time of statehood and is one of the reasons why the sea has become an important wintering and staging area for migratory birds. Populations of up to 1.5 million Eared Grebes have been documented at the sea during recent years along with up to one-half of California's wintering White-faced Ibis, tens of thousands of shorebirds, waterfowl and White Pelicans. Nearly 40 percent of the nesting Black Skimmers in California are found at the sea along with significant breeding colonies of Double-crested Cormorants and Caspian Terns and the largest breeding population of Gull-billed Terns in western North America. In total, more than 380 species of birds have been recorded at the Sonny Bono Salton Sea National Wildlife Refuge, the largest number of species found on any national wildlife refuge in the West. Endangered species are also prominent at the sea. A significant portion of the Yuma Clapper Rail population is dependent upon the sea and the drains that feed the sea. Desert Pupfish are another prominent species present as are endangered California Brown Pelicans.

The Project will result in a reduction of inflow to the Salton Sea either through the proposed use of 6000 acre feet of surface water from the IID or from the proposed use of recycled water from the City of Brawley. Either option of water use would result in less water going into the drains or New River that flow into the Salton Sea. The rerouting of water may have a cumulative impact to the drains and Sea, resulting in the reduction of the Salton Sea's water level and may contribute to the exposure of previously submerged shoreline. Additionally, impacts to the Salton Sea's ecosystem need to be analyzed.

IV: Biological Resources (f) **PSUMI**

The access roads and the proposed well pad sites are currently under cultivation for crops and a preconstruction survey was done on the project plant area by Marie Barrett the last survey completed on February 25, 2009. The site surveyed of approximately 30 acres, found no burrowing owls on-site, however, active burrows were found within 348 to 671 feet of the proposed plant site.

Mitigation Measures:

- A) Construction foreman and workers be given burrowing owl training.
- B) If construction begins in the fall/winter, a survey for Mountain Plover shall be done.
- C) If construction begins in the breeding/nesting season (March-August), a nesting survey should be done 3-7 days prior to start of construction.
- D) Burrowing owl surveys are good for 30 days; if construction is not begun within this time period another survey will be necessary
- E) The CA Dept. of Fish and Game's prescribed mitigation and avoidance measures (CA Burrowing Owl Consortium will be utilized to attempt to avoid this biological resource and is therefore not expected to affect or be a significant impact on biological resources.

V: Cultural Resources (a-d) **PSUMI**

The Project site underwent a cultural resources survey of 189-acres by Tierra Environmental Services in November of 2008. An intensive survey using parallel transects with 10 to 15 meter intervals was conducted throughout the project area consisting of 32.81 acres to be developed into a geothermal power plant and 60 additional wells, each on 2.6 acres, for a total of approximately 189-acres and associated developed roads.

The goal of the project was to identify cultural resources that may be impacted by the development of the proposed land transfer. No previously recorded cultural resources were located within the project area, according to the records search. The survey for the project did not locate any previously unrecorded cultural resources. All of the areas surveyed for the project appeared to be tilled and ripped. Additionally, the project area has been disturbed through the construction of the canals and the tile drains that have been installed underneath the fields. Therefore, although the area may once have been considered likely to have cultural resources present, the repeated disturbances over the years would have likely destroyed any cultural resources or disturbed them to a level where they no longer retain any significance. Therefore, it does not appear that impacts to cultural resources are to be expected from the construction of the project.

Mitigation Measure:

During grading and drilling operations, any unusual specimens of bone, stone, or ceramic are uncovered, all work will cease until a County-approved and qualified archaeologist has been consulted and any cultural resource found at the site will be reviewed for its significance. In the event of discovery of any historic resources during construction and/or operation, appropriate actions would be taken. The Cultural Study did indicate however that there are concerns from the Kamia tribe regarding ground disturbance and the New River and that an archaeological/ and or Native American monitor be present for ground disturbing activities in those areas west of Best Road.

VI: Geology and Soils (a-4) NI

The Project will not expose people or structures to potential substantial adverse effects, including risk of loss, injury, or death involving landslides. The Project would be located on the Valley floor with no potential for landslides.

VI: Geology and Soils (a1,2,3,c,d) PSUMI

The site of the proposed North Brawley geothermal power plant facility is located near the center of the northern half of the Imperial-Mexicali Valley (Salton Trough) which comprises the northern, landlocked, portion of the Gulf of California rift. There are a number of major faults in the Imperial-Mexicali Valley, this region is highly faulted and structurally complex. As stated in the North Brawley EIR... "Some of these faults had the source of intense seismic activity within the last few decades", (Lamar et al. , 1973). The Imperial Valley is a seismic active area and has experienced damage to structures in the past.

A Geotechnical Study was submitted by Black Eagle Consulting and numerous recommendations were addressed in the study. The applicant shall follow all recommendations listed in this study dated August 2008 and as submitted to Environmental Evaluation Committee and Planning Commission. Additionally, applicant shall provide the following mitigation:

Mitigation Measures:

- a) Project shall participate in the County's subsidence detection program, and subsidence monuments would connect with the County's geothermal subsidence detection network.
- b) Benchmarks will be installed to conform to County standards.
- c) Surveying will be performed to National Geodetic Survey (NGS) standards.
- d) The project will participate in the County's seismic monitoring program for the North Brawley Geothermal Overlay Zone.

VI: Geology and Soils (b,e) LTSI

The Project will occupy sites currently disturbed by agricultural crop production. Measures to prevent soil erosion and loss of topsoil have been adopted by the Project. As such, the potential for the Project to result in substantial soil erosion or loss of topsoil is considered negligible and the adverse effects to be below the level of significance.

The Project would use a septic tank if the power plant site passes the necessary soils test. As such, no new impacts associated with soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems are not relevant to the Project.

VII: Hazards & Hazardous Materials (a,b) PSUMI

The conditional use permit activities include Hazardous materials storage and handling practices could impact worker and public safety. Isopentane is a hazardous substance that is subject to federal regulations; an off-site consequence analysis has been prepared for the project. The Hazardous Materials Business Plan submitted on November 2008 indicates that sulfuric acid will be present at the East Brawley facility and is listed as a hazardous material. The Project may create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Numerous engineering, fire-control and safety measures will have to be integrated in the Project to prevent release of isopentane, prevent fires, and to respond to and control fires and other emergencies.

The Project may create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

Mitigation Measures:

All hazardous materials used and stored on the power plant site will adhere to applicable federal and state hazardous materials handling and storage requirements in addition to the Emergency Planning and Community Right-to-Know Act and will follow all the recommendations and requirements in the *Ormat East Brawley Facility Emergency Action Plan*. Additionally, Ormat will follow all of the recommendations and requirements of the *Hazardous Materials Management Plan*.

The Project at the permittee's expense shall relocate the landowners' tenants immediately south and east of the power plant to address the County's concerns about the proximity to a catastrophic failure of an isopentane vessel. No new houses would be constructed as part of the Project.

VII: Hazards & Hazardous Materials (c-h) NI

The Project has no potential to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school as there are none in the vicinity.

The Project would not be located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment.

The Project is located within two miles of the Brawley Municipal Airport. The Federal Aviation Administration issued "Determination of No Hazard to Air Navigation" for the drilling of the six exploration wells. The power plant is also lower than the drilling rig by 100 feet and, thus has no potential to directly or indirectly result in a safety hazard for people residing or working in a project area located within two mile envelope of the public airport.

There are no known emergency actions or evacuations plans applicable to the area. As such, the Project has no potential to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

The Project area surrounding the power plant site well field is irrigated croplands that have a very low wild fire danger. The Project has adopted specific measures to prevent and control fires. As such, the potential for the Project to expose people or structures to a significant risk of loss, injury or death involving wild land fires, including where wild lands are adjacent to urbanized areas or where residences are intermixed with wild lands is considered negligible and the potential adverse effects below the level of significance.

VIII: Hydrology & Water Quality (a-f) LTSI

A Waste Discharge Order was issued for the exploration wells by the CRWQCB in May 2008. The Project includes the commitment to file the CRWQB a report of Waste Discharge for the addition of the power plant and additional wells. As such, the potential for the Project to violate any water quality standards or waste discharge requirements is considered negligible and the potential adverse effects below the level of significance.

Due to the limited amount of surface disturbance associated with the Project operations, the Project will not interfere Substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.

Appropriate erosion control measures would be used to control any offsite discharges, and the Project would adopt any relevant CRWQB best management practices to prevent soil erosion including the preparation of a Storm Water Pollution Prevention Plan. As such, the potential for the Project operation to result in substantial erosion or siltation on or offsite is considered negligible and the potential adverse effects below the level of significance.

stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site is below the level of significance.

There are no existing or planned storm water drainage systems in the Project area. As such, the Project will not exceed or contribute runoff water, which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff. Additionally the Project will not otherwise substantially degrade water quality.

VIII: Hydrology & Water Quality (g-i) NI

The Project does not propose to place any housing within a 100-year flood hazard area as mapped on a Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. No structures are proposed within a 100-year flood area structures which would impede or redirect the flood flows. The Project will not expose people or structures to a significant risk or loss injury or death involving flooding, including flooding as a result of the failure of a levee or dam. The project site is on flat terrain that has no potential of inundation by seiche, tsunami, or mudflow.

loss, injury, or death from flooding, nor be subject to a seiche, tsunami, or mudflow.

IX: Land Use & Planning (a-c) NI

The Project would not physically divide an established community. The proposed geothermal exploratory wells are considered consistent with the County's General Plan, Geothermal/Alternative Energy/Transmission Element, Brawley Geothermal Zone Master EIR, and Land Use Ordinance. There are no known habitat conservation plans or natural community conservation plans encompassing the Project area. As such, there is no potential for the Project to conflict with any applicable habitat conservation plan or natural community conservation plan.

X: Mineral Resources (a-b) NI

Other than the geothermal resources being developed in the Project vicinity, there are no known mineral resources in the Project area. As such, the Project would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.

There are no known mineral recovery sites in the Project vicinity. As, such, the Project would not result in the loss of availability of a locally-important resource recovery site.

~~**XI: Noise PSUMI (a,b,c,d)**~~

~~Site construction and drilling activities would introduce new noise sources to the project area which could result in noise levels above the ambient noise levels in the immediate vicinity of the power plant site and well sites during construction and drilling. The~~

XI: Noise**PSUMI (a,b,c,d)**

Site construction and drilling activities would introduce new noise sources to the project area which could result in noise levels above the ambient noise levels in the immediate vicinity of the power plant site and well sites during construction and drilling. The principle noises indicated by the applicant application would be diesel engines on the construction equipment and drilling rig and the movement of pipe and casing. The application uses baseline noise surveys of 53 to 62 dBA from the Master EIR for the North Brawley Geothermal Study for a 10 MW Geothermal facility. Drilling may be on a twenty-four (24) hour basis provided all the standards in the noise study are met. A best management practice, minimize unnecessary construction vehicle use and idling time. The ability to limit construction vehicle idling time is dependent upon the sequence of construction activities and when and where vehicles are needed or staged, A "common sense" approach to vehicle use shall be applied: its engine shall be shut off.

A Noise Impact Assessment dated December 4, 2008 was received by the Planning Department and all the required mitigation in this study shall be followed including the following mitigation measures are listed below:

MITIGATION MEASURES:

- 1) The drilling operator shall limit drilling noise to a sound level equivalent to CNEL sixty (60) dB(A) as measured at the nearest human receptor outside the parcel boundary. This level may be exceeded by ten percent (10%) if the noise is intermittent and during daylight hours (Land Use Code 91702.01 (B))
- 2) Diesel equipment used for drilling within three hundred (300) feet of any residence shall have hospital-type mufflers. Well venting and testing at these wells shall be accompanied by the use of an effective muffling device or silencer. (Land Use Code 91702.01(D))
- 3) Heavy truck traffic, well site preparation, pipe stacking and hydro-blasting (used for de-scaling operations) shall be limited to the hours between 7:00 AM and 7:00 PM for any wells within three hundred (300) feet of any residence.
- 4) Impulse noises such as sudden steam venting shall be controlled by discharge through a muffler or other sound attenuating system, as appropriate.
- 5) Drilling will be limited within 1000 feet of the New River between October 1 and March 1.
- 6) If any of the noise criteria in assessment are exceeded, additional mitigation measures will be recommended to avoid or reduce the impact.

XI: Noise **NI (f)**

The Project is not located in the vicinity of a private airstrip and has no potential for exposing people residing or working in these kinds of areas to excessive noise levels

XII: Population & Housing **(a) NI**

The proposed Project will not induce substantial population growth in the area either directly (for example, by proposing new homes and businesses) or indirectly (for example through extension of roads or other infrastructure).

XII: Population & Housing **(b-c) PSUMI**

The Project will be displacing a number of people and existing housing, necessitating the construction of replacement housing.

Mitigation Measures:

The Project at the permittee's expense shall relocate the landowners' tenants immediately south and east of the power plant to address the County's concerns about the proximity to a catastrophic failure of an isopentane vessel. No new houses would be constructed as part of the Project.

XIII: Public Services **(a) 1 PSUMI**

The Fire Department comment letter received September 9th, 2008 indicates impacts that will need to be addressed in a fire suppression plan which shall include an analysis of the Gas Scrubber pertaining to Fire Suppression measures to protect against the gases that will contain methane and other non-compressible gases at a rate of 28,100 lbs/hr, a backup system for the proposed diesel fire water pump and an automatic suppression system with a deluge sprinkler system with detectors. An Emergency Response Plan to identify appropriate mitigation measures to minimize such impacts below significant levels is also needed.

Mitigation Measure:

A Fire Suppression System will have to be approved by Imperial County Fire Department. A primary and secondary access road, with all-weather surfacing will have to be constructed. A water transfer system from the cooling towers to the fire water supply system will have to be implemented. An Emergency Response Plan (ERP) will have to be furnished to Imperial County Fire Department. Training will also have to be furnished as required by Imperial County Fire.

— F O R M

XIII: Public Services (a) 5 PSUMI

The project may result in additional air pollution impacts requiring the need for air monitoring of the Project. The construction and maintenance of the project could cause significant environmental impacts. In order to maintain acceptable performance objectives mitigation will have to be implemented to make the project less than significant with mitigation.

Mitigation Measure:

The permittee shall pay all the cost to Air Pollution Control District associated to the monitoring of air impacts of the facility.

XIII: Public Services (a) 2 LTSI

There would be negligible if any need for additional police or security protection services as a result of the Project. The Project may supply their own security during plant construction to prevent theft of equipment.

XIII: Public Services (a) 3-4 NI

The project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for schools, parks or other public facilities.

XIV: Recreation a-b NI

There are no parks or other developed federal, state or county recreational facilities in the Project area or immediate vicinity. The Project would have no direct, indirect or cumulative potential to physically deteriorate or accelerate existing recreational facilities.

The Project does not include or require the construction or expansion of any recreational facilities. The Project would have no direct, indirect or cumulative potential to have an adverse effect on the environment through construction or expansion of recreation facilities.

XV: Transportation (a,b,d,e) PSI

The proposed project may result in significant increases in traffic for the project area. The estimated number of trucks to travel to and from the site could reach 150 or more round trips per day. The department of Public Works requested a Traffic Study in a letter dated September 24, 2008, reviewing the short term construction and long term build out use of the project and suggested mitigations for nearby road intersections as

letter dated September 24, 2008, reviewing the short term construction and long term build out use of the project and suggested mitigations for nearby road intersections as well as road segments and widths must be prepared and traffic nd subject to review and approval by the Public Works Department.

XV: Transportation (c,f,g) NI

The Project would not result in a change in air traffic patterns, including either an increase in traffic or a change in location that results in substantial safety risks. The project will not result in inadequate parking or conflict with adopted policies, plans, programs, supporting alternative transportation (e.g., bus turnouts, bicycle racks).

XVI: Utilities & Service Systems (a-c, e-g) NI

The project would not generate wastewater that would need to be treated. All geothermal fluid from the power plant would be injected back to the geothermal resources or as authorized by the CRWQCB. The Project would also inject Blowdown from the cooling tower. The facilities would use a septic system for other waster disposal which would be permitted by Environmental Health Services. A wastewater treatment plant will not be needed

The power plant would be constructed to prevent offsite discharge of storm-water. A storm water retention basin would be built to contain any storm water. Drilling wastes would be temporarily stored in the on-site containment basin or tanks. A Hazardous Materials Management Plan was prepared and submitted to the California Department of Toxic Substances Control (CDTSC), as the Certified Unified Program Agency (CUPA) for Imperial County and to the Planning Department for the CEQA review process and all procedures in plan will be implemented for this operation.

XVI: Utilities & Service Systems (d) PSI

A CEQA SB 610 water assessment was completed for this Orni 19 LLC geothermal project and found to be incomplete by the Planning & Development Services Department. The document indicated, there appeared to be water available for this project. The project has identified the cooling water for the geothermal plant would be obtained from local irrigation channels under a new contract with the IID. However, the IID has confirmed, no new contract for 6,200 acre feet of water has been drafted or signed between the IID and Ormat. Additionally, it had also been proposed to use water from the City of Brawley's treatment plant for the Project. The City would be required to perform their own analysis of this project should the City Council approve the Concept. As of today, the City of Brawley has not entered into contract with Ormat.

REVIEWING AGENCIES (Copies and/or Notice Provided)

LOCAL AGENCIES

- APCD / AG. DEPT.
- ASSESSOR
- C.E.O.
- COUNTY COUNSEL
- E.H.S. DIVISION
- FIRE / O.E.S.
- FISH & GAME (COUNTY)
- IMPERIAL IRRIGATION DISTRICT
- PUBLIC WORKS DEPT.
- SHERIFF
- I.C. Applicators/Brawley Elem/HS Dist.
IVC Museum

CITIES

- BRAWLEY
- CALEXICO
- CALIPATRIA
- EL CENTRO
- HOLTVILLE
- IMPERIAL
- WESTMORLAND

LIBRARIES

- CALEXICO
- COACHELLA VALLEY
- BRAWLEY
- EL CENTRO
- HOLTVILLE
- IMPERIAL
- IMPERIAL VALLEY COLLEGE
- INDIAN HILL
- MEYER MEMORIAL
- PALO VERDE
- SAN DIEGO STATE UNIVERSITY

STATE AGENCIES

- AIR RESOURCES BOARD
- CALIFORNIA DEPT. OF TRANSPORTATION
- CALIFORNIA HIGHWAY PATROL
- DEPT. OF FISH & GAME *TRUSTEE AGENCY*
- HISTORIC PRESERVATION
- HOUSING & COMMUNITY DEVELOPMENT
- INTEGRATED WASTE MAN. BOARD
- LAND COMMISSION *TRUSTEE AGENCY*
- MINE RECLAMATION (OMR)
- NATIVE AMERICAN HERITAGE
- OFFICE OF PLANNING & RESEARCH (OPR)
- PARKS & RECREATION DEPT. *TRUSTEE AGENCY*
- REGIONAL WATER QUALITY BOARD
- RESOURCE AGENCY
- SCAG
- STATE GEOLOGIST
- WATER RESOURCES BOARD
- OTHER: (Div. of Oil, Gas, & Geo. Resources)

FEDERAL AGENCIES

- BUREAU OF LAND MANAGEMENT (BLM)
- BUREAU OF MINES
- BUREAU OF RECLAMATION
- BORDER PATROL
- MARINE CORPS AIR STATION, YUMA
- NAVAL AIR FACILITY, EL CENTRO
- SOIL CONSERVATION SERVICE
- U.S. FISH & WILDLIFE SERVICES
- OTHER: TMIR, Quechan Indian Tribe
- OTHER _____

FOR ADDITIONAL & GENERAL NOTICING
SEE DISTRIBUTION LIST IN PROJECT FILE

JH/DG/JM/db/S: 037-140-006 ISGEOEXPLWELLSCUP#08-0023

EXHIBIT 19

**EAST BRAWLEY
GEOTHERMAL DEVELOPMENT PROJECT**

UPDATED PROJECT DESCRIPTION

January 29, 2010

Submitted to:

County of Imperial
Planning & Development Services
801 Main Street
El Centro, CA 92243-2811

Submitted by:

ORNI 19, LLC
Ormat Nevada Inc.
6225 Neil Road
Reno, NV 89511



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**EAST BRAWLEY
GEOTHERMAL DEVELOPMENT PROJECT
UPDATED PROJECT DESCRIPTION**

1.0 INTRODUCTION

ORNI 19, LLC, a wholly owned subsidiary of Ormat Nevada Inc. (Ormat), proposes to build the East Brawley Geothermal Development Project in the vicinity of the Brawley 2 Geothermal Exploration Project covered under Conditional Use Permit #07-0029 and the Environmental Impact Report (EIR) for the Geothermal Overlay Zone (g-zone). The project area is north of the City of Brawley in Imperial County, California (see Figure 1).

This Conditional Use Permit application is for the construction of a new 49.9 net megawatt (MW) binary power plant composed of six (6) Ormat Energy Converters (OEC), an expanded geothermal well field beyond the six exploration wells, pipelines to bring the geothermal brine to the power plant, pipelines to take the cooled brine to injection wells, pipelines to distribute noncondensable gases from production wells to power plant area and injection wells, an electric transmission line to interconnect to the substation at the North Brawley 1 Geothermal Power Plant, and a water pipeline to bring water from an Imperial Irrigation District (IID) canal to the power plant for cooling water.

2.0 SUMMARY OF PROPOSED PROJECT

The East Brawley Geothermal Development Project would be located on private agricultural lands just north of the City of Brawley in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, San Bernardino Base and Meridian (SBM). The project is in the g-zone that was covered by the Final EIR dated April 1979 and approved by the Board of Supervisors. It analyzed up to 800 megawatts in the g-zone (see Figure 2). The proposed project is located east of the New River, approximately 1.75 miles east of the North Brawley 1 Geothermal Power Plant along Best Road.

The southern boundary of the project area is just north of the City of Brawley's boundary within their "sphere of influence" and just north of the in-construction Highway 111 bypass in an area zoned M-1 Light Manufacturing. The southwestern boundary of the project is the Del Rio Country Club bounded by the New River. The land to the north and east is agriculture. The eastern boundary of the project is Dietrich Road and to the north Rutherford Road. The majority of the project is along Best Road from Shank to Rutherford Roads. An at-grade intersection will be built at the Highway 111 bypass and Best Road which will provide the best access to the plant site and well field. Well-pads may be accessed from the other county roads in the area: Dietrich, Groshen, Rutherford, Ward and Wills. There are also farm and IID canal roads that will be used to access some well locations (see Figure 3).

ORNI 19, LLC/Ormat Nevada Inc. proposes to permit, construct, operate and maintain the East Brawley Geothermal Development Project that would consist of the following facilities:

East Brawley Geothermal Development Project
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- A 49.9 net MW geothermal power plant consisting of up to six (6) OEC binary generating units (16 MW gross each) with vaporizers, turbines, generators, condensers, preheaters, pumps and piping, motive fluid (isopentane) storage, a motive fluid vapor recovery system (VRU), a gas scrubber, and possibly a regenerative thermal oxidizer (RTO) and related ancillary equipment;
- Two (2) cooling tower batteries with a total of 14-20 cell counter flow, induced draft with drift eliminators of 0.0005 efficiency;
- A control room, office, maintenance shop, parking, and other facilities located at the power plant site;
- Approximately 34 total wells, approximately half for production and half for injection. The final number of wells will be determined by drilling results. Each well will average 4500 feet in depth. Production wells will have a gas separator and corrosion and scale inhibitor and a geothermal fluid booster pump to pump the fluid to the power plant. Each well will also have a sand separator and/or filtration system;
- Piping from production wells to the power plant and from the power plant to the individual injection wells. Gas pipelines will take the gas contained in the brine from the gas separators to either the injection wells or to the gas scrubber at the power plant;
- Blowdown wells (2-4) at the power plant site to provide for injection of the cooling tower blowdown;
- Pumps, tank, valves, controls, flow monitoring and other necessary equipment to the wells and pipelines;
- Maintenance of the production and injection wells cited above;
- Piping, canals or ditches and pumps to bring water from IID's Rockwood Canal to the power plant;
- A pipeline crossing over New River, that would primarily allow connection of geothermal wells located on both sides of the river. This crossing was included in an amendment to the East Brawley CUP application submitted to the County in March 2009, and in Section 5.7 below; and
- A substation with a 2 mile long double circuit 13.8 and 92 kilovolt (kV) transmission line with 66 high poles to interconnect to the IID at the North Brawley 1 substation at Hovley and Andre Roads.

The major components of the proposed East Brawley Development Project, and their function and location are summarized in Table 1.

East Brawley Geothermal Development Project
 Updated Project Description

Table 1: East Brawley Geothermal Development Facilities Summary

East Brawley Geothermal Development Project Facilities Summary			
Facility	Size	Location	Function
Well pads	Up to 34 well pads (including the four existing exploration well pads) would be about 316 feet by 356 feet in size (~2 acres each). A mud sump/containment basin of about 75 feet x 260 feet x 7 feet deep would be located on each well pad.	Identified well pads from the exploration phase would be utilized to the extent feasible. Additional wells would be drilled as needed to provide adequate production fluid and injection capacity at well sites.	Well pads include all the equipment necessary to operate a well. During development, any additional drilling would occur from the well pads. Well pads also include containment basins for drilling and maintenance of the wells
Production Wells	Inside diameter of the production wells would be approximately 30 inches at the top and would telescope with depth. Wells are expected to average about 4,500 feet deep.	Production wells would be located on the well pads at the well sites shown in. Approximately 17 production wells each on separate well pads are projected.	Production wells flow geothermal fluid to the surface that is then transported via above ground pipelines to the power plant to generate electricity.
Injection Wells	Injection wells would be the same size as production wells.	Injection well locations have not yet been designated but would be among the well sites. Up to 3 injection wells could be located on each pad. A total of 17 injection wells each on separate well pads are projected.	Injection wells are used to inject spent geothermal fluid from the power plant back into the geothermal reservoir. Injection ensures the longevity and renewability of the geothermal resource.
Geothermal Production Fluid Pipeline	The pipeline system would vary in insulated diameter from 8 to 30 inches depending on individual well productivity. Up to about 9 miles of production pipeline could be constructed.	The piping system would connect the wells to the power plant. The production fluid pipeline would be located within the pipeline corridors.	Geothermal fluid would be transported from the production wells to the power plant via the geothermal production fluid pipeline.

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East Brawley Geothermal Development Project Facilities Summary			
Facility	Size	Location	Function
Injection Fluid Pipeline	The injection piping system would vary in insulated diameter from 8 to 30 inches. Piping would extend from the power plant to the injection wells. Up to about 9 miles of injection pipeline could be constructed.	The injection pipeline would be located among the pipeline routes.	Cooled geothermal fluid would be transported from the power plant to the injection wells via the injection fluid pipeline where it would be injected into the geothermal injection reservoir.
Access Roads	Access roads would be no less than 10 feet wide.	Access roads would extend from existing County roads to the well pads. Existing farm roads would be used to the extent practical. Access roads developed for exploration would be used for any wells and pads that are used for development. Where new pads are created, new access road would be developed.	Access roads are used during development to construct the production wells and install equipment. During utilization, access roads are used for accessing wells for maintenance.
OEC Units	Six, 16 MW (gross) OEC units (manufactured by Ormat Turbines, Ltd.) comprised of vaporizers, turbines, generators, condensers, preheaters, pumps, and piping.	The modular OEC units would be located on the power plant site.	The OEC units are the proprietary modular binary geothermal power generation equipment used on the power plant site.
Motive Fluid Pressure Vessels	The motive fluid would be stored in two, 11,880-gallon pressure vessels.	The motive fluid pressure vessels would be located on the power plant site.	The motive fluid pressure vessels would be used to store isopentane for use in the OEC units.
Vapor Recovery Unit	The vapor recovery unit consists of a diaphragm pump, a vacuum pump, and activated carbon canisters.	The vapor recovery unit is located on the power plant site.	The vapor recovery unit would provide a mechanism to minimize emissions of isopentane from the OEC units during maintenance.
Substation	The substation would occupy a site about 150 feet by 150 feet in size (about 0.5 acres).	The substation would be located adjacent to the power plant.	The substation converts power generated from the plant to the proposed line voltage, 92 kV.

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East Brawley Geothermal Development Project Facilities Summary			
Facility	Size	Location	Function
Interconnection Transmission Line	There would be a new two-mile long double circuit 13.8- and 92-kilovolt (kV) interconnection transmission line with 66-foot high poles.	The interconnection transmission line would connect to the IID grid at the North Brawley 1 substation at Hovley and Andre Roads. The new line would span the New River. One proposed route and one alternative route are under consideration.	The interconnection transmission line would transfer the electricity generated by project to the existing power grid for distribution.
Noncondensable Gas Distribution Line	The noncondensable gas distribution line would range from 4-8 inches in diameter. Up to about 4.3 miles of pipe could be constructed.	Noncondensable gas distribution lines would run from well pad separators and power plant site separators to the injection wells.	Noncondensable gases from separators and other equipment would be compressed and injected into the subsurface reservoir.
Regenerative Thermal Oxidizer (RTO) and Caustic Scrubber	The top of the scrubber would be about 30 feet high.	The RTO/scrubber is located adjacent to the power plant.	The RTO/scrubber unit is BACT for the abatement of potential NCG emissions
Cooling Tower	Two cooling tower units (each with seven to ten cells), would be used (manufactured by Cooling Tower Depot, Inc.). The cooling towers would be the largest and most prominent facility on the power plant site (about 54 feet in height).	The cooling towers would be located on the power plant site.	The cooling towers would provide cooling water to condense the motive fluid vapor in the condensers.
Water Conveyance System	The water conveyance system would be a 10 - 24 inch pipeline, about one mile in length, for water coming from IID source. See text for alternatives to IID water.	Water intake from the IID Rockwood Canal Gate 131 would be either underground or put inside of the Livesley Drain that runs between the canal and the power plant site. See text for alternatives to IID water.	The water conveyance system would provide makeup water for the cooling tower at the power plant site.
Blowdown Wells	Two to four cooling water blowdown injection wells would be constructed similar to the geothermal injection wells.	The blowdown injection wells would be located adjacent to the power plant.	The dedicated blowdown wells are used to inject cooling water blowdown to reduce the concentration of dissolved solids in the cooling water.

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East Brawley Geothermal Development Project Facilities Summary			
Facility	Size	Location	Function
Power Plant Site and Common Facilities	The power plant would occupy about 15 acres of the 30-acre parcel on which it would be located.	The power plant would be located on private land owned by ORNI 19, LLC.	The power plant site is the physical location where electricity would be generated using modular OEC binary geothermal power plant technology.
Control Room, Office and Maintenance Shop	The footprint of these facilities is depicted on Figure 5.	Each of the facilities would be located on the power plant site.	These habitable structures would be used to control, manage and maintain the project operations.

Construction would commence soon after the CUP is issued. Construction of the power plant would require approximately 15 months. Construction would require up to 200 workers at peak construction. Well drilling, pipeline construction, interconnection transmission line construction, and construction of the power plant would all be concurrent.

3.0 PROJECT LOCATION AND ACCESS

The project area is located within Imperial County, California, about 12 miles southeast of the Salton Sea and 25 miles north of the U.S. border with Mexico (Figure 1). The project is within the North Brawley Geothermal Overlay Zone and the Brawley KGRA, in the Imperial Valley, California (Figure 2). The geothermal overlay zone is a zoning classification developed by the County of Imperial to facilitate development and utilization of geothermal resources in areas of identified geothermal development potential.

The project area is comprised of multiple geothermal leases overlaying privately owned cultivated properties in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, San Bernardino Base and Meridian (SBB&M).

The project is comprised of a power plant and a wellfield; the specific locations of each of these are described below.

3.1 Location and Access of Power Plant

The East Brawley Geothermal Power Plant would be located on private agriculture lands in the southeast corner of Section 15, Township 13 South, Range 14 East, SBB&M identified by Assessor’s Parcel Number 037-140-06-01. This is located about one mile north of the City of Brawley. The total property size is 32.81 acres and will not be subdivided. The power plant area will be enclosed by a 6 foot wire fence in an area approximately 900 by 600 feet not including the substation or stormwater retention basin. The house that is currently on the property is vacant and will be demolished as part of project construction activities. A house across the street

East Brawley Geothermal Development Project
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will be vacated and also demolished during construction and prior to the delivery of isopentane to the new plant.

Access to the power plant will be on Best Road just north of Ward Road from a left hand turn pocket built for this project (see traffic study). Best Road will be widened by about 20 feet in this section to accommodate a northbound left turn lane at the entrance point. The necessary tapers are provided, based on 55 mph design, which represents the Prima Facia speed limit, the design speed for the road and Caltrans design criteria. It will be necessary to cover Best Canal along the property frontage to accommodate widening of the road for the turn pocket.

The emergency access will be from Best Road into the south end of the property on the north side of the Livesley Drain. The emergency access road will be constructed with an all-weather surface and lead to a locked gate that can be opened by any emergency responders.

Both of the entrances into the plant site provide excellent access from the new Highway 111 bypass that will include an exit onto Best Road just south of Shank Road. Traffic will come from Interstate 8, north on Highway 111 to Best Road.

3.2 Location and Access of Well Field

The East Brawley geothermal wellfield is laid out in a grid pattern over much of the project area. The power plant site would be centrally located within the wellfield in Section 15. The well field will be located between Rutherford Road on the north, Dietrich Road on the east, the New River on the west, and just north of Shank Road on the south. Access to the wellpads and pipelines will be from Best, Baum (not a county road), Groshen, Kerhsaw, Rutherford, Ward, and Wills Roads. Additionally, farm and IID roads may be used for access. Encroachment permits for ingress/egress and irrigation canal and drain crossings would be obtained from the Imperial County Public Works Department and IID as applicable.

Access to farm land would be coordinated with the landowners to minimize impacts to the farming operations. The wellpads and pipelines will be along the edges of the fields. New access roads would be constructed or improved only as needed to safely accommodate traffic required for wellpad construction, well drilling and well and road maintenance. Road widths to well pads would typically be no less than ten feet wide.

4.0 DESCRIPTION OF POWER PLANT

The proposed power plant can be described as having four interdependent operating systems: (a) the geothermal fluid system; (b) the motive fluid system and fire suppression; (c) the geothermal NCG and RTO/gas scrubber system; and (d) the cooling water system. Each of the OEC units would be able to operate independently but would share common ancillary components such as isopentane storage, geothermal brine supply and injection equipment, cooling towers, substation, etc. Each of the power plant systems are described below.

4.1 Geothermal Fluid System

Geothermal fluid from the geothermal reservoir at about 4,500 feet below the surface would be pumped to the surface from the geothermal production wells. At the surface the geothermal fluid would be transported from the well field via a pipeline system to the power plant site. At the power plant site the produced geothermal fluid would be directed to flow through the six proposed OEC units. The geothermal fluid system is a closed loop system. The geothermal fluids from the production wells would be transported to the power plant site and would flow through the level 1 and level 2 vaporizers and preheaters of each OEC unit, transferring the heat to the isopentane motive fluid through the OEC's shell and tube heat exchangers. The cooled or spent geothermal brine would then be sent to the geothermal brine injection system without coming into contact with the atmosphere.

4.2 Motive Fluid System and Fire Suppression

The OEC is a power generation unit which converts low and medium temperature heat energy into electrical energy. Each OEC unit is an integrated closed cycle vapor turbo-generator system that recycles an organic motive fluid in a fully closed loop with no discharges to the environment. The OEC unit operates in a standard power generation cycle (Rankine cycle) similar to the power generation cycle used in a steam turbine.

The motive fluid selected for the East Brawley Project is isopentane. Isopentane is a flammable, but nontoxic, petroleum hydrocarbon that vaporizes at relatively low temperatures under most atmospheric conditions. The isopentane is circulated through the OEC unit. Heat from the geothermal fluid would be transferred via heat exchangers to vaporize the isopentane in a two-level series of preheaters and vaporizers. The vaporized isopentane would be directed through turbines which rotate generators converting mechanical energy into electricity.

On the backside of the turbine-generators the isopentane vapor would be cooled and condensed back to liquid form in water-cooled condensers. The liquid isopentane would then be returned to a storage tank where it would be cycled back to the OEC units again for reuse. The spent geothermal fluid would be transported on the surface via pipelines to injection wells in the well field where it would be pumped back into the subsurface geothermal reservoir.

The generated electricity would be transformed into line voltage and delivered via an interconnection transmission line to a local utility power grid for distribution. ORNI 19, LLC is negotiating a power purchase agreement (PPA) for sale of the energy generated by the project with a major California utility.

The vaporized isopentane motive fluid from the level 1 and level 2 vaporizers would turn the level 1 and level 2 turbines which together turn a common generator that produces the electricity that is delivered to the substation where it is delivered to the transmission lines. The vaporized isopentane is then condensed in a shell and tube condenser and returned to the preheaters and vaporizers to repeat the cycle. The isopentane motive fluid is therefore also circulated within a closed-loop system, with no significant, routine release or discharge of isopentane.

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The isopentane motive fluid system includes the isopentane side of the OEC Units, two (2) 11,880-gallon isopentane pressure vessels, and an OEC vapor recovery unit (VRU) on each OEC condenser. A vapor recovery unit would be used during major maintenance activities on any of the OEC Units.

Each OEC Unit contains approximately 23,000 gallons of isopentane (in the vaporizers, preheaters, condensers and piping). In each OEC, the motive fluid system is designed as a closed-loop, although there would be minor fugitive leaks from the valves, connections, seals, and tubes. Isopentane from these leaks would be released to the atmosphere or would leak into the geothermal or circulating cooling water lines. Operators would frequently inspect the OEC Units leaks and visual signs of fugitive emissions. Isopentane leak detectors are utilized throughout the facility and continuously monitored.

Any noncondensable gases in the air or water which may leak into the isopentane system would eventually collect in the OEC condenser and reduce the efficiency of the OEC Unit. In order to remove these noncondensable gases, each OEC condenser would have a small (~0.106 scf/hr) OEC VRU. Each OEC VRU would consist of two chambers and a set of isolation valves. Operation of each OEC VRU would be controlled by the power plant computer control system, which would start the OEC VRU noncondensable gas "purge" sequence whenever the efficiency of the OEC Unit fell below a set point. During "purging," nearly all of the isopentane vapors in the OEC VRU would be compressed into liquid isopentane and returned to the OEC Unit, while the noncondensable gases, together with some small quantity of isopentane vapors, are discharged to the atmosphere.

Some major maintenance activities require that at least a portion of an OEC Unit be cleared of isopentane motive fluid liquid and vapors prior to performing the maintenance activities. To control and minimize isopentane emissions during these maintenance activities, the liquid isopentane is drained from the section of the OEC Unit (preheater, vaporizer or condenser) to be maintained or repaired and transferred to another portion of the OEC Unit, the isopentane storage tank, or another OEC Unit. A vacuum pump would then be used to evacuate and compress most of the remaining isopentane vapors, returning the isopentane liquid to the OEC Unit. Those isopentane vapors which do not condense would be released through the isopentane vapor recovery unit, which would adsorb nearly all of the remaining isopentane vapors.

To reduce the risk of fire, isopentane vapor and flame detectors connected to the power plant computer control system are placed at strategic locations around the OEC Units to quickly alert the plant operators to any such hazardous situations. The fire protection system would include an approximately 2,500-gpm diesel firewater pump. Water nozzles/monitors would be placed at the power plant site to be used to minimize the risk of a fire spreading should one start within the power plant. A Risk Management Plan would be prepared for this facility for isopentane.

4.3 Noncondensable Gas and Regenerative Thermal Oxidizer/Gas Scrubber

NCGs are naturally occurring gases in the geothermal fluid that are not easily condensed by cooling. They are predominantly (99.9%) made up of nitrogen, carbon dioxide and methane. The NCG separated from the geothermal production fluid would be compressed and injected back

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into the geothermal reservoir with the spent geothermal fluid. Under very high NCG content in the geothermal production fluid conditions, some of the NCG may be treated in a regenerative thermal oxidizer (RTO) and gas scrubber system to remove air pollutants from the NCG before venting the scrubbed NCG to the atmosphere.

Each of the production wells would deliver geothermal fluid to the power plant through production pipelines. The geothermal fluids would first flow from the production wells through closed, high-pressure well pad separators which would separate most of the geothermal noncondensable gases from the geothermal brine. If the quantity of geothermal noncondensable gases in the geothermal fluid is less than the high end of the possible range, all of these separated geothermal noncondensable gases would flow through other dedicated pipelines to the power plant site, to be dissolved or entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. Small quantities of these separated geothermal noncondensable gases would be discharged to the atmosphere along the dedicated pipelines as condensate, created as the gases cool, is drained from the pipeline.

However, if the quantity of geothermal noncondensable gases in the geothermal fluid is at the high end of the possible range, up to twenty-five percent of these separated geothermal noncondensable gases would flow through other dedicated pipelines to the RTO unit/caustic scrubber system located at the power plant site. The remaining seventy-five percent of the separated geothermal noncondensable gases would flow through the dedicated pipelines to be dissolved or entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. As described above, small quantities of these separated geothermal noncondensable gases would be discharged to the atmosphere along the dedicated pipelines as condensate created as the gases cool is drained from the pipeline.

Up to twenty-five percent of the geothermal noncondensable gases separated at each of the well pads would be delivered through dedicated noncondensable gas pipelines to the RTO unit/caustic scrubber system located at the power plant site. The proposed RTO unit would receive the noncondensable gases from the noncondensable gas pipelines. These gases are expected to contain sufficient hydrocarbons and oxygen (with supplemental air and a small amount of propane) to support complete combustion. Propane would also be used to pre-heat the RTO unit during cold start-ups.

The RTO unit would oxidize the hydrocarbons in the NCGs and supplemental propane to carbon dioxide and water vapor in an exothermic process.

The RTO unit would initially combust, and then abate, at least 97 percent of the benzene, methane and other hydrocarbons in the NCGs it receives. It is considered Best Available Control Technology (BACT) for the abatement of hydrocarbons and volatile organic gases in a wide variety of applications. The RTO unit would also oxidize at least 97 percent of the hydrogen sulfide in the NCGs delivered to the RTO unit. The oxidation of hydrogen sulfide in the RTO unit would produce sulfur dioxide (SO₂) and water vapor. The resulting SO₂ emissions would be controlled by the caustic scrubber.

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The low temperature combustion in the RTO unit is flameless and, thus, would not create appreciable nitrogen oxides (NOX) from the oxidation of atmospheric nitrogen.

The proposed caustic scrubber would receive the carbon dioxide, water vapor, sulfur dioxide, nitrogen oxides and other gases produced from the oxidation process in the RTO unit (as well as the gases passing through the RTO unit unoxidized). Before entering the caustic scrubber, the hot gases would be cooled through a direct contact quenching process. The quenched gases would then proceed to the caustic scrubber, where they would be subjected to counter-flows of caustic absorbate (water and sodium hydroxide). The caustic absorbate reacts with the sulfur oxides in the quenched gases to produce sodium sulfates and sulfites, both water-soluble compounds that are dissolved in the caustic scrubber water and piped to a storage sump at the bottom of the scrubber. The remaining gases from the RTO unit are vented out the top of the caustic scrubber through a 30-foot tall stack. The small quantity of spent absorbate would be drained from the storage sump and piped to one of the cooling towers. Fresh absorbate would be added as needed to make up for the loss of exhausted absorbate. The caustic scrubber would remove at least 97.5 percent of the sulfur oxides in the gases it receives. It is considered Best Available Control Technology (BACT) for the control of sulfur dioxide.

A control panel with a programmable logic controller would be used to provide monitoring and control of the RTO unit/caustic scrubber system. RTO unit/caustic scrubber system scheduled maintenance would be coordinated with the maintenance schedule for the East Brawley power plant. The RTO unit/caustic scrubber system would operate at least 95.9 percent of the hours the power plant is operating (equivalent to operating 8,400 hours per year if the power plant operates 8,760 hours per year). When the RTO unit/caustic scrubber system is undergoing unscheduled maintenance or otherwise not operating, the geothermal NCGs would bypass the RTO unit/caustic scrubber system and would be delivered to the cooling towers for release to the atmosphere unabated.

4.4 Cooling Water System

The cooling water system would consist of cooling towers using standard wet cooling tower technology. Cooling water would be used to cool the motive fluid in the condensers and would cycle back to a cooling tower where the water would be cooled, stored and made available for reuse as system process water.

A simplistic diagram of the geothermal system processes minus the NCG and air emission abatement system is schematically represented in Figure 4.

The isopentane vapor condensate is cooled by water circulating from the cooling tower through the condensers. Evaporative cooling in the cooling tower cools the circulating water. A small portion of the circulating water would be injected into the geothermal reservoir via dedicated cooling tower blowdown wells adjacent to the power plant site. The cooling tower blowdown removes the dissolved solids from the water that are concentrated as the water is cycled or reused in the cooling tower.

4.5 Water Conservation and Water Supply

4.5.1 Estimate of Quantity of Make-Up Water

The cooling towers would circulate an average of approximately 195,000 gallons per minute (gpm) total of cooling water to the OEC Units. An average of approximately 2,600 gpm of circulating cooling water would be evaporated from both cooling towers, and both would also blowdown (discharge) an average of approximately 800 gpm. To maintain water balance, the cooling towers would require an average of approximately 3,400 gpm or 5,500 acre-feet per year (total) of cooling tower makeup water.

Binary power plants such as the one proposed are closed loop systems such that geothermal brine produced from the geothermal reservoir is injected in whole back into the geothermal reservoir. Therefore, only a brackish water supply is needed for the cooling system. This is different from a geothermal flash plant where the condensed geothermal steam is used for the cooling water. Flash plants are used on higher temperature geothermal resources than is the case with the East Brawley resource.

Sodium hypochlorite (bleach) would be used for bacterial control in the towers as well as other chemicals for pH control and corrosion inhibition.

4.5.2 Water Saved by Conservation Measures

The estimated amount of water required for the East Brawley power plant is about 5,500 acre-feet. This is 27% proportionally less than that initially requested for Ormat's nearby North Brawley power plant and a 9% further reduction from North Brawley's final design quantity. This is the result of plant design and water optimization changes that were also implemented for the East Brawley power plant, thus a decreased amount than originally stated in the East Brawley CUP application.

The East Brawley Project area occupies approximately 100 acres so the water required for this project equates to about 67 acre-feet/acre. By comparison, farmland consumes about 5.5 acre-feet/acre. However, the project would supply electricity to 50,000 people, or about the entire population of Brawley, and would generate revenue of \$6,500/acre-foot of water compared to \$164/ac-ft for alfalfa based on data from the Summit Blue Consulting, LLC *Renewable Energy Feasibility Study* prepared for Imperial County in 2008.

4.5.3 Water Supply from IID

Ormat plans to obtain its water for cooling tower make-up from the Imperial Irrigation District (IID). Therefore, water losses (via evaporation and blowdown) from the cooling tower would be made up by irrigation water obtained under contract from the IID. Although the Best Canal is closest to the power plant, IID has indicated it does not have the capacity to deliver the water from this canal due to changes in that canal south of the City of Brawley. Makeup water would be obtained from IID Gate 131 on the Rockwood Canal located about one-half mile east of the power plant site. The water from the Rockwood Canal would be gravity fed or pumped in a 10-24 inch pipeline that would be either underground or put within the Livesley Drain that runs east to west between the canal and the power plant (Figure 3).

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The project's water consumption would be met by the IID through their current resources, transfers from other sources or would be offset through water conservation projects identified and approved by IID. Water taken from IID would be subject to the approved Equitable Distribution program during years of water supply demand imbalances. The IID is currently developing an Integrated Water Resources Management Plan to address the water supplies for new non-agricultural projects. In the immediate term the IID has completed an *Interim Water Supply Policy for New Non-Agricultural Projects* (IID 2009) which was recently approved by the IID Board of Directors approval. The IID is expected to execute the pending contract agreement with Ormat for Project water supply upon approval of the interim policy.

4.5.4 Water Supply Alternative: From City of Brawley Wastewater Treatment Plant

As described above, Ormat plans to obtain its water for cooling tower make-up from IID. However, as an alternative and/or supplemental source of water supply, Ormat is currently working with the City of Brawley to obtain treated, or recycled, water from their wastewater treatment plant located immediately west of the power plant site (Figure 2). Ormat and the City of Brawley have entered into a Memorandum of Understanding to facilitate exclusive negotiations for the reclaimed wastewater which includes the construction of a tertiary system to the City's secondary system which is currently being upgraded by the City. The additional agreements include an operations and maintenance (O&M) agreement for operation of the tertiary facility. The City would ultimately own and operate the tertiary facility when it is completed.

This source of water would not be available until 2013 when the tertiary treatment plant would be expected to be completed. Therefore, in the interim period, water from the IID and/or other alternative sources (as described below) would still be needed for the project.

Under this alternative, the City would deliver reclaimed water to the East Brawley Project which is approximately ¼-mile east of the treatment plant adjacent to the New River where it currently discharges treated wastewater under an NPDES permit. The City currently generates approximately 4,400 acre-feet (3.9 mgd) of wastewater per year. As stated above, the estimate of the water requirement for the East Brawley Power Plant would be 5,500 acre-feet per year. Assuming that the effluent from the WWTP will average 4,400 acre-feet a year, ORNI 19, LLP would be capable of utilizing all (100 percent) of the recycled water for cooling water makeup. However, as noted below, an additional source of water would be required during the hot summer months.

As noted, the new tertiary treatment facility is currently scheduled to be operational in early 2013. Thus, water from the Imperial Irrigation District and/or other alternative sources (as described below) would be needed for the project in the interim period. A summary of the conceptual design of the City of Brawley tertiary treatment and delivery system is provided below. The design of this project is currently only in conceptual design phase, so the final design may change somewhat from that described below.

Description of Current WWTP and Planned Expansion

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This treatment plant utilizes a lagoon system to treat 3.9 mgd of domestic sewage (2008 average daily flow). The City of Brawley is currently upgrading the existing WWTP to increase its average daily flow capacity to 5.9 mgd, and to meet more stringent NPDES permit requirements for ammonia removal. Construction of the plant upgrade is expected to begin in early 2010 and be completed by late 2012. Although the upgraded and expanded plant will produce a higher quality secondary effluent, this effluent will not be of the quality required to meet the California Title 22 criteria for direct use of recycled water in open recirculating cooling water systems. Additional tertiary treatment facilities will be required in order to meet these requirements, as well as water quality requirements specific to cooling water system operation.

Water Supply Objectives from Brawley WWTP

Ormat's objective is to meet 100 percent of the make-up water demand for the cooling towers at the proposed East Brawley power plant with reclaimed water. As noted above, engineering estimates are that for a 50 MW plant, the make-up requirement would be up to 5,500 acre-feet per year, which means that Ormat will use 100 percent of the recycled water from the WWTP and will need an additional water supply. Additional water sources are described in Section 4.5.5 below.

Tertiary Treatment Objectives

Tertiary treatment consisting of coagulation, filtration and disinfection will be required to meet or exceed the performance objectives of the California Recycled Water Criteria (Disinfected Tertiary Title 22 Recycled Water; California Code of Regulations (CCR), Title 22) for direct use in open recirculating cooling water systems. This level of treatment will produce effluent that is low in turbidity, BOD, and microorganisms. Title-22 disinfected tertiary recycled water means a filtered and subsequently disinfected wastewater that meets the following criteria from the CDPH Purple Book Update. The requirements for filtered wastewater are at 22 CCR 60301.320, and the disinfection requirements at 22 CCR 60301.230.

Tertiary Treatment Processes

Secondary treatment involves oxidation and clarification, which are already provided by existing plant. In order to provide tertiary treatment, three components are traditionally necessary according to 22 CCR. These processes include flocculation, filtration and disinfection. The tertiary system will be based on either the addition of flocculation tanks and filtration systems, or the use of membrane bioreactors, and upgrading the disinfection process in order to assure meeting the applicable requirements. As stated above, a conceptual plan for the project is currently underway but not yet finalized. Per an internal draft of the conceptual plan, possible treatment methods to be included in the tertiary treatment plant include the following:

- Pretreatment
 - May include some form of phosphate reduction/removal, including chemical precipitation with lime, alum, polyaluminum chloride, or ferric chloride – if phosphate reduction is not low enough from the City's upgraded secondary treatment system. Minimum phosphate levels are required to protect the cooling tower system from corrosion.

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- Solids Processing, which would include pumping coagulated, settled solids/sludge from the sedimentation basins into a 100,000 gallon concrete storage sump, and from there the solids would be pumped to solids processing. The options for solids processing include recycling tertiary solids to WWTP (pumping the solids to the WWTP's activated sludge thickeners, or centrifuges), pumping the solids to the WWTP lagoons, or dewatering the solids with new centrifuges.
- Filtration. The following three alternatives for filtration/removal of suspended organic and inorganic solids from water have been considered:
 - Multi-media (such as use of silica sand, crushed anthracite coal, and garnet or ilmenite, alone or in dual and triple combinations) filters (gravity filters and pressure filters)
 - Cloth disk media filters (use of a cloth membrane as the filter medium)
 - Immersed membrane filters (including use of micro-filtration (MF) and/or ultra-filtration (UF) membranes)
- Disinfection: The tertiary treated water must be disinfected in order to meet the Title 22 criteria for recycled water use within open recirculating cooling water systems. In addition, disinfection of water controls biological activities in the cooling water systems as part of the chemical treatment program. Disinfection options include the following:
 - Ultraviolet light (UV) disinfection (either by using the WWTP's new UV system or a new system)
 - Chlorination disinfection, using either by dissolving chlorine gas in water or by adding hypochlorite salts or solution, all of which lead to the formation of hypochlorous acid (HOCL).

Water Storage

The effluent from the tertiary treatment system will be directed to a storage unit before it is conveyed to the East Brawley plant. Three options are being considered:

- Conversion of the current Lagoon #4 at the WWTP to a storage pond. This pond can store about 5 million gallons of water (currently preferred option)
- Construction of a water storage tank, about 5 million gallons, to be located on the property of the Brawley WWTP
- Construction of a water storage tank, about 5 million gallons, to be located on Ormat's East Brawley power plant property, immediately adjacent to the WWTP

Conveyance/Pipeline

The City of Brawley WWTP is within ½ mile of the East Brawley Power Plant, making conveyance of water relatively simple. The water would be conveyed via a pipeline, approximately 2,000 feet in length from the WWTP to the East Brawley cooling towers. The pipe would be manufactured from HDPE, and would be about 20 inch diameter. It would be buried about three (3) feet below ground, except being deeper below the railroad bed. The pipeline route is shown on Figure 8. The only property other than the City's and Ormat's would be the railroad, of which Ormat would obtain permits to place the pipe under the railroad right of way.

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Need for Additional Water Supply During Summer Heat Conditions

After 2013 when the tertiary treatment system would be complete, Ormat's engineering calculations show that during summer heat conditions, the water from the WWTP may not be enough in itself for cooling tower make-up and additional water may be required from another source. It is estimated that on average the additional amount of water that will be required would be approximately 700 gpm (1,100 acre-ft/yr). The possible sources of additional water are described below.

1. Future Growth of Brawley. With estimated growth rates of the City of Brawley, there should be year-round adequate supply of water from the WWTP in about 10 years. After this, Ormat would not need any additional water source.
2. Water Supply from IID: In the even that Ormat relies entirely on WWTP recycled water, a smaller water contract with the IID will be considered for the secondary water source. This is the primary option until Ormat can obtain enough water from WWTP after further growth of Brawley. As described above, water will be obtained from IID Gate 131 on the Rockwood Canal and piped to the plant. If canal water is used, 1,100 acre-ft a year would be required to supplement the amount from the WWTP.
3. Use of Blowdown Water: Treatment of the cooling tower blowdown water (from both this plant and possibly North Brawley plant) is being investigated so that the water can be reused in the cooling tower instead of injected into the geothermal reservoir.
4. Water from Shallow Groundwater Wells: Using "ground water", as a back-up water source during peak periods. The groundwater would need to be treated, either with reverse osmosis membranes or with a nano-filtration membrane. This is a desirable water source as it is currently not used and unusable for most other applications (the total dissolved solids is too high for use in agriculture), and the only impact we can see brought up as an issue being subsidence, but mitigation measures will be incorporated into the project for this (as described below).

Description of Possible Groundwater System: As a backup water source during peak periods, it is estimated that there would be about two groundwater wells that will be drilled and used to supply this water, with each well will being about 400-700 feet in depth. The wells would be approximately 24 inches in diameter at the top and telescope with depth. Each well pad will be up to 5 x 6 feet (30 ft²). The total production capacity of the wells will be up to about 1,500 gpm if used only as a backup source. In order to pump the water from the wells, on each well a centrifugal vertical production pump will be installed. The water will be pumped through carbon steel pipes to a water desalination system for purification for use in the cooling tower. The system would be based on salt rejection membranes (nanofiltration and reverse osmosis). The water desalination system will be installed in a 40 foot shipping container adjacent to the cooling tower.

The system would be comprised of various components including a sand separator, chemical dosing system (anti-scalant and acid), a series of micron filters and membranes, two booster pumps, and a control system (PLC controlled). The desalination system is

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expected to have 40% to 60% recovery ratio (40%-60% of the feed will be purified and used as cooling water makeup). The water desalination system will have two streams coming out of it: Permeate and Concentrate. The permeate will be used for cooling tower makeup. Because this water will be so clean, it is expected that 5-10 cycles of concentration in the cooling tower will be achieved with this water source. The concentrate will be injected into the geothermal reservoir together with the cooling tower blowdown.

Mitigation Measure Incorporated into Project for Subsidence from Use of Groundwater:

The following measures are incorporated into the project to monitor and mitigate for subsidence:

- Adequate subsidence network benchmarks will be placed around the plant site and tied to the County first order network and will be surveyed annually to detect the occurrence of subsidence. This data will be promptly submitted to the Imperial County Department of Public Works (ICPWD). The benchmarks would be installed to conform to County standards. Surveying would be performed to National Geodetic Survey (NGS) standards. The North Brawley 1 project has received approval for the program for the North Brawley Geothermal Overlay Zone which also covers the East Brawley project area.
- Mitigation measures such as increased injection rates, deeper injection wells and/or curtailed production operations are initiated subject to Division approval if a recognizable subsidence bowl forms in the project vicinity, or if unusual aquifer or injection interval pressure changes are observed.

4.5.5 Potential Impacts from Water Usage

Impacts to Water Supply/Utilities/Water Service Systems: Development Design Engineering (DDE) of El Centro prepared a SB610 Water Supply Assessment (WSA) of the proposed project (DDE, 2009). This study was intended for use by the County of Imperial in its evaluation of water supplies for existing and future land uses. The evaluation examined water availability, expected demands of the project, and reasonably foreseeable planned future water demands to be served by IID. DDE, worked extensively over 9 months in close consultation with IID to gather and confirm the accuracy of the data and information presented in the WSA. IID water staff provided significant input to the document and deemed it acceptable before it was submitted to County Planning. A summary of the report is provided below.

The Water Supply Assessment has determined that IID's water supply is sufficient to meet project needs. Water supplies for the Imperial Unit are anticipated to satisfy projected water demands for 20-years given IID's existing agricultural, municipal and industrial uses, water conservation and transfer requirements, rules and regulations, and operational policies. Particular operational policies are the draft Interim Water Supply Policy (IWSP), and the in-process Integrated Water Resources Management Plan (IWRMP).

The WSA stated that water supplies for the Imperial Unit are sufficient to satisfy water demands of IID's current agricultural, municipal and industrial uses, water conservation, and transfer requirements for the term of the QSA. Given IID's rules and regulations, operational policies,

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water supply for new uses in the Imperial Unit are anticipated to satisfy water demands for the 20-year projection of this WSA. In particular, the draft IWSP and the in process IWRMP provide that 25,000 acre-feet will be made available in the near-term and an expected 50,000 acre-feet in the long-term for new municipal, commercial and industrial uses.

The area that would be taken out of agricultural production as a result of the EBGDP is estimated to use 991 acre-feet per year as farmland which uses a consumption rate of 5.25 acre-feet per acre annually. Based on the history of water delivered to the same area by IID from 1998 to 2007, on average the project site has received 912 acre-feet per year. A change in land use from agricultural to industrial for the area that would be taken out of agricultural production as a result of the EBGDP results in an annual consumption of 5,500 acre-feet per year. This is an increase of 455.00 +/- and 503.07 +/- percent when compared to the annual water usage for the area that would be taken out of agricultural production as a result of the EBGDP based on a consumption rate of 5.25 acre-feet per acre per year, and the average of IID's 10-year annual delivery history for the same area respectively.

In addition to the WSA, it is important to point out that the IID has approved and allocated the use of 25,000 acre-feet per year for non-agricultural/industrial uses through its "Interim Water Supply Policy for Non-Agricultural Projects" (dated 9-29-09). The approved 25,000 afy for potential non-agricultural projects within the IID's water service area far exceeds the combined water needs of all of the non-agricultural projects currently proposed. As such, sufficient water resources should be available for each of the projects. Additionally, as described above, Ormat has received a signed MOU with the City of Brawley to construct facilities designed to supply water to this geothermal project.

Impacts to Biological Resources: Prior to the County's preparation of the Initial Study for the East Brawley project, Development Design Engineering (DDE) of El Centro, prepared a study of the impacts of the project to the IID drains and the Salton Sea. DDE's analysis of the impacts to the IID drains and the Salton Sea ecosystem concluded that the impacts would be less than significant. This is supported by the information we present below and by the simple inference that because DDE's evaluation clearly concluded that the proposed project would have a negligible or less-than-significant impact to the water supply to the Salton Sea, it can be inferred or implied that the impacts to biological resources as a result of this insignificant reduction in water would also be insignificant.

Potential Impact to IID Drains & Salton Sea: Development, Design & Engineering (DDE) prepared an evaluation of the impacts of the proposed project to IID Drains & Salton Sea, dated December 3, 2009. As summarized in this report, the proposed water use for the facility is 5,500 acre-feet / year. This is the approximate amount of water needed to irrigate 1,048 +/- acres of agricultural land in Imperial Valley based on the assumption that an average acre of agricultural land uses 5.25 acre-feet per year, which is the 2009 apportionment for water users that have eligible farmable cropland. After analyzing the impacts of the project to IID drains and the Salton Sea, DDE determined that any potential impacts are negligible, or less than significant, for the following reasons:

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- The agricultural equivalent of land that correlates with ORMAT'S proposed water use equates to approximately 0.23% of IID's irrigated acreage, an insignificant amount.
- Approximately 13% of the total irrigated acreage within the Imperial Unit is irrigated at least twice, which conveys additional water to IID drains and the Salton Sea. When compared to this additional drainage water, the proposed project's reduction to drainage water is insignificant.
- Assuming the total average irrigated acreage of the Imperial Unit uses 5.25 acre-feet per acre per year; ORMAT proposes to use approximately 0.2% of all water used for agriculture in the Imperial Unit, an insignificant amount.
- The proposed project's reduction in drainage water is approximately 0.12% of the total outflow of the Salton Sea through evaporation, an insignificant amount.
- The proposed project's loss of drainage water is approximately 0.2% of the amount of drainage water generated from Imperial Unit's total average irrigated area, an insignificant amount.

Cumulative Impacts from Use of Water: In response to the report described above, IID inquired about an assessment of cumulative impacts considering other industrial facilities whose water use (or potential water use) would reduce the inflow conveyed to IID drains and subsequently, the Salton Sea. Following is a cumulative impact analysis on inflow to IID Drains and the Salton Sea, prepared in concert between Ormat, DDE, and Barrett's Biological Services.

The geothermal projects for which water applications have been submitted to IID and/or where CUP applications have been submitted to Imperial County for new industrial projects total approximately 8700 ac-ft. These include:

- East Brawley at 5500 ac-ft,
- Approximately 800 ac-ft for CHAR's Hudson Ranch 1 project, and
- Approximately 2400 ac-ft for CalEnergy's Black Rock projects at 800 ac-ft each.

This total combined amount of water from these projects is approximately 1/3 of the 25,000 ac-ft allocated by IID for industrial use under the IWSP for non-agriculture projects. Using the same calculations as those previously done for East Brawley, 8700 ac-ft calculates to 2523 ac-ft less to the drains ($8700 * 29\%$ (% of water to tile/drains) which is less than 0.2% of the water evaporated from the Salton Sea. Thus, this cumulative loss of water to the drains and ultimately from proposed projects is also insignificant. Additionally, no one drain will be impacted more than another. As a side note, rather than an adverse cumulative impact, there is actually a positive cumulative impact from these projects, in that this water reduces the amount of salt going to the sea by 8,700 tons.

The approved 25,000 ac-ft for potential non-agricultural projects within the IID's water service area far exceeds the combined water needs of all of the non-agricultural projects currently proposed. As such, sufficient water resources should be available for each of the projects.

Which Drains will be Impacted by Reduction of Water: In the same response to DDE's December 3 report, IID stated that "the project proponent did not address which drains will be impacted by the facility (there may be direct impacts to the drains discharging to the Salton Sea

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and that may have pupfish present). Also the assessment lacked proper location of facility, making it difficult to evaluate any other wildlife species issues, such as Yuma Clapper Rail." Following is information to respond to this comment, again, prepared in concert between Ormat, DDE, and Barrett's Biological Services.

There are no drains near the proposed East Brawley power plant site that drain directly to the Salton Sea. Biological surveys completed in the area for the East Brawley project found no pup fish or Yuma Clapper Rail habitat. The project site is only 32.75 acres which will equal $(32.75 \times 5.25 = 172 \text{ ac-ft} \times 29\%)$ 50 ac-ft of water less to the Livesley Drain which is adjacent to the property. The 5500 ac-ft needed for this project and the loss of 1595 ac-ft to the drains that results would not come from that specific area but generically from the entire IID system. Taking "away" 5500 acre-feet of water from agriculture, which is what is implied, would be spread across the IID's district, not in the project area. Thus, $5500 \text{ ac-ft} \times 29\% = 1595 \text{ ac-ft}$ less to drains across the county. If the same assumption is used for 8700 ac-ft, $(8700 \text{ ac-ft}/2,730,000)$, 0.32% less water goes to the drains from these proposed industrial projects. This is an insignificant cumulative loss which also would not affect vegetation and/or wildlife found in the drains and/or the Salton Sea.

Review of IID's draft Integrated Water Resources Management Plan (IWRMP aka IRP) and Interim Water Supply Policy (IWSP) for Non-Agricultural Projects. Ormat has reviewed the IWRMP, participated in IID meetings and submitted extensive comments. The document contains much incorrect data about existing geothermal projects in the valley in addition to cooling technologies that are not viable in this meteorological environmental. We have submitted similar comments to the California Energy Commission. The use of geothermal steam condensate for cooling water, which is source of water for flash plants, causes depletion of the geothermal resource, subsidence, and release of the noncondensable gases from the geothermal fluid and produces geothermal scales that may be hazardous. Whereas, the Ormat binary process which requires "raw" water eliminates these negative environmental impacts. This is viewed as that the Ormat binary process is a much cleaner and environmentally sound method over steam and flash type plants, and certainly an environmental improvement over coal and gas power plants.

Review and Compliance with the IID Water Conservation and Transfer Project Draft Habitat Conservation Plan (HCP): Ormat and its team of consultants reviewed these documents. As shown in the calculations above, the proposed amount of water is insignificant to biological resources and, thus, will not impact either individually or cumulatively the requirements of the IID Water Conservation and Transfer Project draft HCP. In addition, pending the City of Brawley's completion of upgrades to the treatment plant currently scheduled for 2012, tertiary treated water is planned to replace IID's pending water contract. Therefore, this is a temporary use of canal water from IID, about 2-5 years.

5.0 DESCRIPTION OF WELLFIELD, DRILLING, TESTING, PRODUCTION, INJECTION

5.1 Geothermal Wellfield (Revised)

The Brawley geothermal wellfield is laid out in a grid pattern over cultivated fields in the project area. The grid pattern is generally aligned along field roads located adjacent to existing irrigation channels or drains.

A description of the revised/updated well field was included in an amendment to the East Brawley CUP application submitted to the County in March 2009. This information is provided below. A copy of the latest wellfield map is provided in Figure 3.

The well field was revised in March 2009 to reflect addition land that has been leased and the results of the exploration well drilling to date. The total well count has also dropped from 60 to about 34. It will still be split about equal between production and injection wells. The New River pipeline crossing is also reflected on the revised map. The amount of pipeline in the well field will be reduced as a result of less wells and a consolidated well field. Several of the well pads on the south end of the field will be best accessed from Shank Road.

Ormat has obtained an easement from the Imperial Irrigation District (IID) for the transmission line routing along Ward Road to the west of the proposed plant location. They own parcel number 037-160-51-01, a 5.78 acre parcel between the railroad and the Veysey parcel.

Ormat was selected by the City of Brawley to negotiate exclusively for the water from their Waste Water Treatment Plant. Ormat proposes to build the upgrades needed to bring the facility to tertiary treatment and then give the facility to the City and pay for the water via an operations and maintenance agreement. The City will be the CEQA lead agency for this project. The treatment plant will generate enough water for the East Brawley power plant such that canal water from the IID will only need to be a backup once the facility is built. Ormat is requesting that the County and the City work together under a Memorandum of Understanding to prepare a single CEQA document that satisfies both the City and the County because the issues brought up in the EEC hearing would be the same – impacts to water and ecosystems of the IID drains and Salton Sea.

This realignment of the well field will have less impact than the project as originally proposed as it is smaller. Biological and cultural resource surveys will be performed to duplicate those already completed on the other areas of the project.

Access to the well pads and pipelines would be from Andre, Best, Baum (not a County road), Groshen, Kershaw, Rutherford, Ward, and Wills Roads. Additionally, farm roads and IID roads (with permission) may be used for access. Encroachment permits for ingress/egress and irrigation canal and drain crossings would be obtained from the Imperial County Public Works Department and IID as applicable. With the exception of two well sites (14-15 and 15-15), all of the proposed well sites are located east of the New River. Access to farmland would be

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coordinated with the landowners to minimize impacts to the farming operations. The well pads and pipelines would be along the edges of the fields. New access roads would be constructed or improved only as needed to safely accommodate traffic required for well pad construction, well drilling, and well and road maintenance. Road widths to well pads would typically be no less than ten feet wide.

5.2 Well Drilling

Geothermal well drilling would be conducted from constructed well pads approximately 316 feet by 356 feet (about 2 acres). A well pad sump/containment basin (nominally 75 feet x 260 feet x 7 feet deep) would be constructed on each well pad to contain drilling mud and rock cuttings from the drilling operations (Figure 6). A Stormwater Pollution Prevention Plan (SWPPP) has been prepared for the geothermal well field and is amended for the construction of each new well pad to prevent stormwater discharges from the well pads during site construction.

Standard geothermal well drilling equipment and well drilling operations would be implemented for the project. The wells would be drilled using a large rotary drilling rig whose diesel engines are permitted under the California Air Resources Board (CARB) Portable Engine Registration Program (PERP). The wells would be drilled with water-based mud to circulate the drill cuttings to the surface. During drilling, the top of the drill rig derrick would be as much as 175 feet above the ground surface, and the rig floor could be 20 to 30 feet above the ground surface. The typical drill rig and associated support equipment (rig floor and stands; draw works; derrick; drill pipe; trailers; mud, fuel and water tanks; diesel generators; air compressors; etc.) would be brought to the prepared site on approximately 40 or more large tractor-trailer trucks. The placement of this equipment within each prepared site would depend on rig-specific requirements and site-specific conditions.

The well bore would be drilled using non-toxic, temperature stable gel-based drilling mud or gel and polymer drilling fluid to circulate the rock cuttings to the surface where they are removed from the drilling mud. The mud is then recirculated. Rock cuttings would be captured in the containment basin. Additives would be added to the drilling mud as needed to prevent corrosion, increase mud weight, and prevent mud loss. The inside diameter of the wells would be approximately 30 inches at the top and would telescope with depth. The typical design depth of both the production and injection wells is projected to be about 4,500 feet. Each geothermal well would be drilled and cased to the design depth or the depth selected by the project geologist. The final determination of well depth and well completion would be based on geological and reservoir information obtained as wells are drilled.

The California Division of Oil, Gas and Geothermal Resources (CDOGGR) regulates geothermal well drilling operations on private lands in California. CDOGGR approves the drilling program for each well including the blow out prevention equipment (BOPE) to ensure the drilling operations are safe, protect the community, and protect land and water resources. Drilling operations would take place for 24 hours per day, 7 days per week. Each geothermal well would take approximately 30 days to complete.

5.3 Well Testing

Wells would be tested while the drill rig is still over the well. The residual drilling mud and cuttings would be flowed from the well bore and discharged into the drilling sump. This cleanout flow test may be followed by one or more short-term flow tests, each lasting from several hours to a day and also conducted while the drill rig is over the well. These tests typically consist of producing the geothermal well into portable steel tanks brought onto the well site while monitoring geothermal fluid temperatures, pressures, flow rates, chemistry and other parameters. Steam from the geothermal fluid would be allowed to discharge to the atmosphere. Produced fluid from the short-term flow test would be pumped back into the well.

An injectivity test could also be conducted by injecting the produced geothermal fluid from the steel tanks back into the well and the geothermal reservoir. The drill rig would likely be moved from the well site following completion of these short-term test(s). Following the short-term test, all equipment would be removed and the well shut in. Temperature profiles of the wellbore would be measured during the shut in period.

After the rig has moved, a longer-term test could be conducted using a test facility consisting of approximately ten, 21,000-gallon steel tanks, injection pumps, coil tubing, nitrogen pumps, filtration units, flow meters, recorders, and sampling apparatus. This test could last for 30 days. Steam from the geothermal fluid would typically be allowed to discharge to the atmosphere. The remaining water would be injected back into either the well from which it was produced or into a second well via temporary pipeline routed along the well site access roads.

Following completion of the short-term geothermal well testing, all of the drilling and testing equipment would be removed from the site. The surface facilities remaining on the site would typically consist of several valves on top of the surface casing, which would be chained and locked and surrounded by an approximately 12-foot by 12-foot by 6-foot high fence to prevent unauthorized access and vandalism.

5.4 Production and Injection Wells

Geothermal resources required to supply the power plant would be supplied from the production wells surrounding the power plant location. Geothermal fluid injection wells would be required to inject the geothermal fluid produced for the project back into the geothermal reservoir. The production and injection wells would be drilled from selected well sites. More than one injection well may be placed on an injection well pad to reduce the use of farmland for the project.

As geothermal production and injection wells age they typically produce less and/or cooler geothermal fluid, or inject less fluid, and may need to be redrilled or worked over. Redrilling or reworking a well requires many of the same activities required to drill a new well. These activities would occur periodically over the life of the project. Any of the geothermal production wells which do not demonstrate sufficient commercial productivity may be converted to an injection well. Any of the wells could also be converted to a monitoring well, or could be abandoned in conformance with the requirements of the CDOGGR.

Dedicated cooling tower blowdown wells (2-4) would be drilled in the same way as an injection well. The only difference is the fluids they take for injection is the water from the cooling tower which is not geothermal brine. These wells would be located adjacent to the power plant.

5.5 Well Site Production and Injection Equipment

Each new production well would be equipped with a pump driven by an electric motor located on top of the well pump discharge head. A small, truck-mounted well maintenance rig would install these pumps in the wells. Other small trucks and vehicles would be involved in installing the pump, which is normally conducted only during daylight hours. An electric cable installed along the pipeline from the power plant would provide the electricity to power the well pump motor. Mineral oil is pumped down from the surface at the rate of one to three gallons per day to lubricate the downhole pump lineshaft bearings. This lineshaft bearing lubrication water or mineral oil would be discharged into the produced geothermal fluid and eventually injected into the geothermal fluid injection reservoir. The mineral oil is less than 2 ppm of the volume injected. Production wells would have corrosion and scale inhibitor located on the well pad with secondary containment.

Production wellhead dimensions are not expected to exceed a height of fifteen feet above the ground surface or four feet in diameter. An approximately 8-foot by 15-foot, 10-foot high motor control building may be located within approximately 50 feet of each production well. It would house and protect the auxiliary well systems, motor switchgear controls and sensors, and transmitters for temperature, pressure, and flow rate data. The wellhead, pump motor and motor control building would each be painted an earth tone color to blend with the area and minimize visibility. A gas separator would also be located on each well pad used for production wells. They are 6 feet in diameter, 20 feet long and stand 18 feet tall. Up to about twenty-five percent of the geothermal noncondensable gases separated at each of the well pads may be delivered through dedicated noncondensable gas pipelines to the geothermal noncondensable gas scrubbing system located at the power plant site as described previously.

Each well pad would also include a sand separator for removing sand from the geothermal fluid and a booster pump to increase geothermal fluid pressure. Neither wellhead pumps nor the auxiliary equipment or motor control buildings are required at the injection well sites. Instead, injection pumps located at the power plant site would pump the geothermal injection fluid through the injection pipeline system, providing sufficient pressure to inject the cooled geothermal fluid back into the geothermal reservoir. More than one injection well may be located on an injection wellpad. It is likely that some sort of sand separator and/or filtration system will be located at the injection well pads (in addition to production well pads).

5.6 Geothermal Pipeline Systems

Above ground pipelines will be constructed to deliver the produced hot geothermal fluid from the production wells to the power plant site (aka geothermal production fluid pipelines). Similarly, above ground pipelines will be constructed to return the cooled or spent geothermal fluid from the power plant site to injection wells for subsurface injection of the fluid back into the geothermal reservoir (aka geothermal injection fluid pipelines). The proposed interconnecting production and injection fluid pipeline routes are shown on Figure 3.

East Brawley Geothermal Development Project
Updated Project Description

Each of the production wells would deliver geothermal fluid to the power plant through new pipelines routed in corridors adjacent to existing farm roads or parallel to, but outside of the rights-of-way of County roads. The total length of new pipeline would depend on which of the production wells were connected to the power plant. Ormat either has geothermal leases with the landowners where the pipelines would be located or would work with the landowners to obtain easements for the placement of the pipelines to minimize impact to farming operations and to stay outside of Imperial County rights-of-way, not only existing but for future expansion.

Similarly, the injection fluid pipelines to the injection wells would be routed in corridors adjacent to existing farm roads or parallel to, but outside of the rights-of-way of County roads. In some sections, the injection pipeline would also parallel the new production pipeline. Here the injection pipeline would either be placed adjacent to, or atop ("piggyback") the production pipeline. The total length of new injection pipeline would also depend on which of the injection wells were connected to the power plants.

The total length of new pipeline would depend on which of the wells were connected to the power plant. If all of the approximately 35 wells were connected, then approximately 9 miles of new production fluid pipeline would be constructed.

The production and injection pipelines would be constructed from steel pipe designed, constructed, tested and inspected pursuant to current industry standards for high temperature, high pressure piping. The diameter of the steel pipe would vary depending on the type and amount of geothermal fluid to be conveyed. Once covered with about two inches of insulation (one inch for injection pipelines) and a protective metal sheet (appropriately colored to blend with the area), the overall outside diameter of the finished pipe would range from 8 to 36 inches. The pipelines would be constructed near ground level (averaging about one foot off the ground) on pipeline supports installed approximately every 20 to 40 feet along the pipeline routes.

"Expansion loops" would be constructed about every 250 to 500 feet along the production pipeline route so that the pipeline could "flex" as it lengthens and shortens due to heating and cooling. These square bends in the pipeline are typically horizontal, approximately 40 feet in length by 40 feet in width. Some expansion loops are vertical, although these are typically smaller, 15 to 20 feet high. Electrical power and control cables for the production well pump motors and valves, and production and injection wellhead instrumentation would be installed in steel conduit constructed on the pipe supports, buried in a trench dug next to the pipelines or provided by an aboveground electrical distribution line. Injection pipelines have fewer expansion loops.

Some new access roads would be built for pipeline construction or maintenance. Pipeline construction would not require significant grading of the pipeline route. The pipeline would be constructed to cross beneath existing roads to allow continued access. Pipeline crossings of any unpaved roads (including Ward) would typically be constructed by the cut-and-fill method, which minimizes the time during which traffic on the road would be impacted. A trench would be cut through the road and a prefabricated U-shaped section of insulated, wrapped geothermal

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fluid pipe, placed inside a larger diameter pipe or otherwise protected so that it is strong enough to support traffic on the road above, would be placed in the trench. The excavated dirt would then be backfilled and compacted around and above the pipeline or pipe sleeve, and the roadbed material would be repaired or replaced. Access would typically be restricted for only a few hours during actual construction. Appropriate traffic controls (including detour signs) would be in place during any construction within the roadbed or adjacent shoulders of each road to warn and control traffic.

For the crossing of Best Road, the pipeline and accompanying power and control cables would be installed by cut and fill technique or with microtunneling procedures. The latter technique does not disrupt traffic and neither technique would cause settlement of the roadbed. Microtunneling would be conducted by specialty contractors using specialized equipment. Oversize steel casing would be installed behind a boring machine that would be advanced under the road by "jacking." Pits would first be excavated and braced at each end of the casing run. The boring machine and casing sections would then be lowered into one pit. The boring machine (with casing behind it) would be "jacked" under the road using specially designed jacks. Casing sections would be welded together as they are moved forward to form a continuous casing under the road. Once the welded casing is in place under the entire road the boring machine would be removed through the other pit. Cement grout under pressure would be used to fill any voids between the casing and the dirt under the road.

The pipeline crossing of the New River would interconnect facilities on the east and west sides of the river. The crossing is discussed in further detail in Section 5.7 below.

Pipeline crossings of the Imperial Irrigation District (IID) canals or drains would be above ground or underground at their request. All River and IID canal and drain crossings would be engineered and constructed in conformance with the applicable IID encroachment permit requirements. Field drains and head ditches would be crossed by the pipelines as agreed to with the individual landowner/geothermal lessor.

Pipeline construction would be conducted concurrent with the construction of the power plant.

5.7 New River Pipeline Crossing

A description of this project was included in an amendment to the East Brawley CUP application submitted to the County in March 2009. This information is provided below. See the March 2009 submittal for draft figures and drawings; however, the plans have been revised/refined somewhat and the latest preliminary draft plans are available from Ormat.

This project involves the installation of piping over the New River north of the City of Brawley, east of Highway 111 and Andre Road and just south of the City of Brawley's Wastewater Treatment Plant (See attached figure). It will be located on private land (APN 037-140-02-01) owned by Veysey, Victor V. & Janet D and under lease to ORNI 17, LLC in the southeast corner of Tract 118 (see map). Several pipes from geothermal pads on the east side of New River will be extended across the New River (WGS 84 33°1'01.4"/115°31'12.1"). The pipes will allow connection of geothermal wells located on both sides of the river. The pipe crossing at the river

East Brawley Geothermal Development Project
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will be approximately 18 feet wide and begins at the end of a private road on each side of the river.

The crossing will support the following equipment:

- 2 x 24 inch geothermal brine lines
- 2 x 12 inch noncondensable gas lines (mostly carbon dioxide)
- 1 x 16 inch pipe for canal water for cooling tower make up
- 1 x 12 inch pipe for cooling tower blow down water (possibly from North Brawley to East Brawley)
- A 36 inch cable tray for power and control cables
- A man walkway for maintenance and inspection

The crossing would be a truss structure spanning the river. The footings to support the structure and pipes will be approximately 15-20 foot square on each side of New River. A total of two footings will be placed approximately 10 feet east and west of the bank of New River. The footings are located in an area of sparse vegetation consisting of salt cedar (*Tamarix sp.*). The area necessary for construction activities will be approximately 100 feet and will be located east and west of the bank of New River.

The pipes will be constructed of industrial standard designation of "extra heavy" wall thickness. An automatic injection pump shut-off and check-valve system will immediately stop fluid flow should a leak or break occur in any of the pipes. A system of pressure and flow sensing devices, capable of detecting any leak or spill, would be installed and maintained. Additionally, the pipelines would be inspected on a regular basis. The crossing and pipelines will be designed, engineered, manufactured and assembled to perform and comply with all the relevant county, state and federal regulations such as California Building Code, ASME and OSHA.

The pipe will be positioned through the use of cranes located east and west of the bank of New River. Other construction equipment will include a forklift, water truck, backhoe and loader. The area on each side of the river where the crossing will be anchored is flat and will require minimal grading. No grading permit is anticipated to be required based on the amount of dirt to be moved. The anchors will be away from the river bed. Erosion control measures will be implemented if the final design indicates that protection of the river is needed from potential erosion or run-off during construction. Construction time will be brief; approximately five to six weeks.

Locked gates will be located over the pipelines on each end of the crossing to prevent public access. There will be a walk way area to allow workers to inspect the pipelines, there is no vehicle access. The gates will signed "private property" and "no trespassing" in both English and Spanish.

Potential impacts to biological resources, cultural resources, and other issues were discussed in the March 2009 submittal with a conclusion of no significant impact from the New River Bridge Crossing.

6.0 TRANSMISSION AND INTERCONNECT

ORNI 19, LLC is negotiating a power purchase agreement (PPA) for sale of the energy generated by the project with Southern California Edison (SCE). If these negotiations falter, the project would not stop as ORNI 19 LLC could either contract with other utilities or energy companies or could use an option under the existing North Brawley Geothermal Project PPA with SCE which allows them to sell up to 100 MWs.

A substation would be located on the west side of the power plant site. A new transmission line would interconnect to the IID at the North Brawley 1 substation located near the intersection of Hovley and Andre Roads. The interconnection line would be a 2- to 5-mile long double circuit 13.8- and 92-kilovolt (kV) transmission line with 66-foot high poles. The transmission line pole and turning structure designs have not yet been completed, but the distance between the conductors and the ground wire near the top of poles will exceed 60 inches to prevent the potential electrocution birds that may perch on the poles. Both the new substation and the interconnection transmission line would be part of the East Brawley Project. The new line would span the New River, but no structures would be constructed within the River. Encroachment permits and easements would be obtained from the landowner or agencies as required for permitting and installation of the interconnection transmission line.

The proposed interconnection transmission line route and one alternative route are under consideration as shown in Figure 7. The proposed interconnection line would be routed to the west from the power plant substation, crossing the New River and would be aligned north of Andre Road to the interconnection point at the North Brawley 1 substation (west route). The alternative interconnection transmission line route would course northerly to an alignment on the south side of Baum/West Baughman Road turning west and crossing the New River to Hovley Road where it would turn to the south to the North Brawley 1 substation interconnection point (north route). The substation and interconnection transmission line construction would be conducted concurrent with the construction of the power plant.

The substation at North Brawley is the point of demarcation between Ormat and the IID. The substation is owned by ORNI 18, LLC. The transmission lines beyond the substation are owned and operated by IID to a point of interconnection with California Independent System Operator's (CAISO) controlled grid.

7.0 ABANDONMENT AND SITE RESTORATION

The projected life of the Project is a nominal 30 years. At the end of the useful life of the Project, equipment and facilities would be properly abandoned. The geothermal wells would be abandoned in conformance with the well abandonment requirements of the CDOGGR. Abandonment of a geothermal well involves plugging the well bore with clean drilling mud and cement sufficient to ensure that fluids would not move across into different aquifers. The wellhead (and any other equipment) would be removed, the casing cut off at least six feet below ground surface, and the well site reclaimed.

East Brawley Geothermal Development Project
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At the end of power plant operations, the project would prepare and implement a Site Abandonment Plan in conformance with Imperial County and CDOGGR requirements. The Plan would describe the proposed equipment dismantling and site restoration program in conformance with the wishes of the respective landowners/lessors and requirements in effect at the time of abandonment. Typically, above-ground equipment would be dismantled and removed from the site. Some below ground facilities may be abandoned in place. The surface of the site would then be restored to conform to approximate pre-project land uses.

8.0 ALTERNATIVES CONSIDERED BUT ELIMINATED

An alternative project location for the project was considered, but it was determined that the proposed project was specific to Ormat's geothermal leases in East Brawley. A geothermal project must be sited near the commercial geothermal resource it is utilizing because the geothermal resource cannot be transported long distances without losing its heat and viability as an exploitable energy source. Ormat acquired the proposed power plant location because of its location with respect to the geothermal resource and the availability for purchase. As such, an alternative project location was eliminated from further consideration.

9.0 ENVIRONMENTAL PROTECTION MEASURES

Measures intended to mitigate potential impacts from occurring as a result of the Project construction and operations were listed in the CUP application and applicant's provided Environmental Assessment.

10.0 LIST OF OTHER STUDIES PERFORMED FOR PROJECT

Barrett's Biological Surveys. 2008. *Ormat East Brawley Plant, Preconstruction Survey, Imperial County*. (May 2008). Prepared for Ormat Nevada, Inc.

Barrett's Biological Surveys. 2007. *Biological Technical Report, Ormat Geothermal Plant Site, North Brawley, California*. (May 15, 2007). Prepared for Ormat Nevada, Inc.

Darnell & Associates, 2009. *Traffic Study for East Brawley Geothermal Development Project*. December 1, 2009 (revised)

Development Design & Engineering. 2009. *East Brawley Geothermal Development Project, SB 610 – Water Supply Assessment – FINAL*. (August 11, 2009). Prepared for Ormat Nevada Inc.

Development, Design & Engineering, 2009. *Environmental Assessment of ORMAT's East Brawley Geothermal Development Project's Potential Impact to IID Drains & Salton Sea*. December 3, 2009

Environmental Management Associates, 2008. *Application for Authority to Construct ORNI 19, LLC – Ormat Nevada, Inc., East Brawley Geothermal Development Project*. October.

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Tierra Environmental Services. 2008. *A Cultural Resources Survey of 189-Acres Proposed for Geothermal Development near Brawley, Riverside [sic] County, California.* (November 2008).

Tierra Environmental Services. 2009. Letter Report: *Additional Cultural Resources Survey for the East Brawley Geothermal Project.* (March 17, 2009).

FIGURES

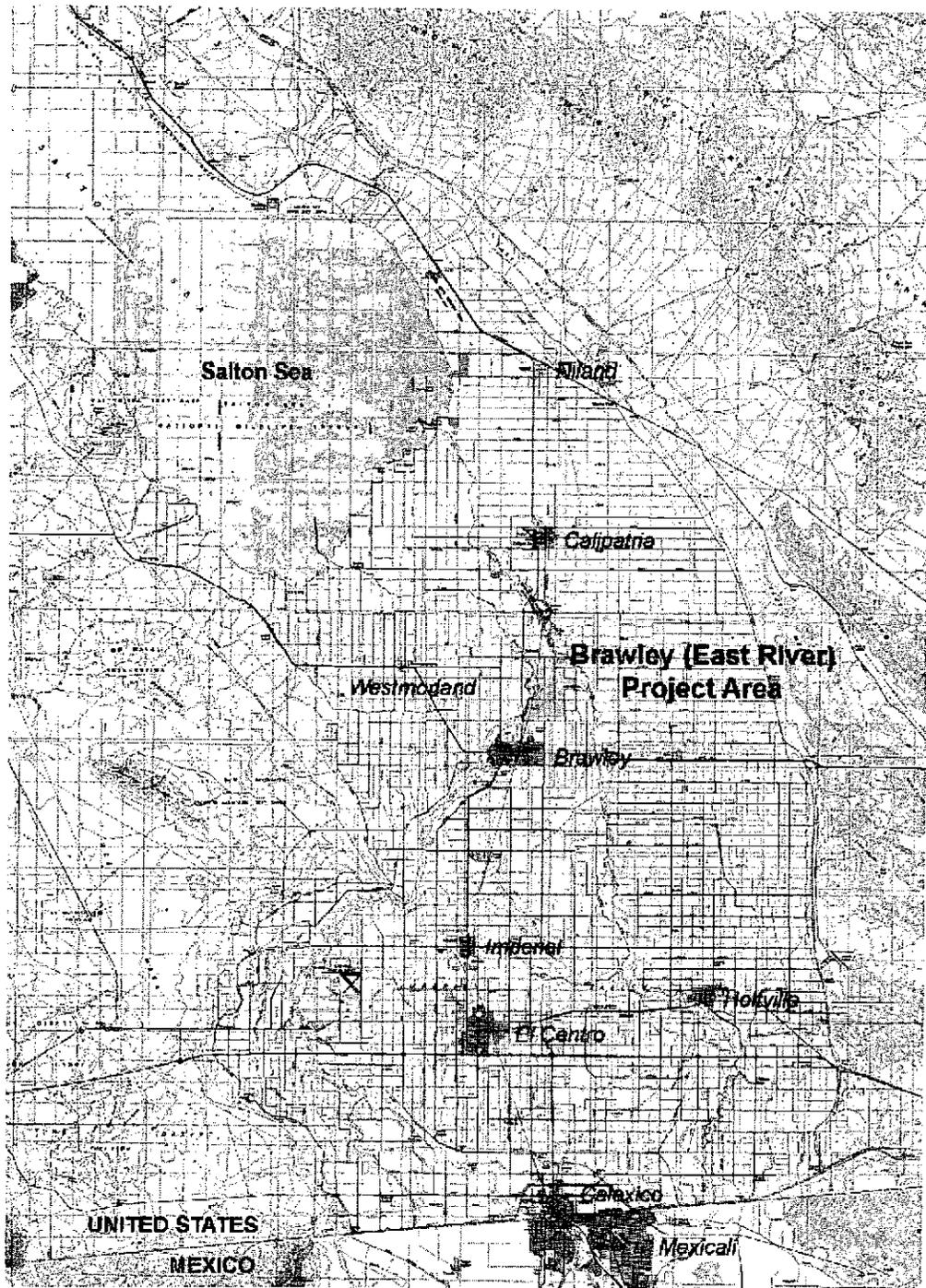


Figure 1: Location Map – Brawley East River Geothermal Development Project

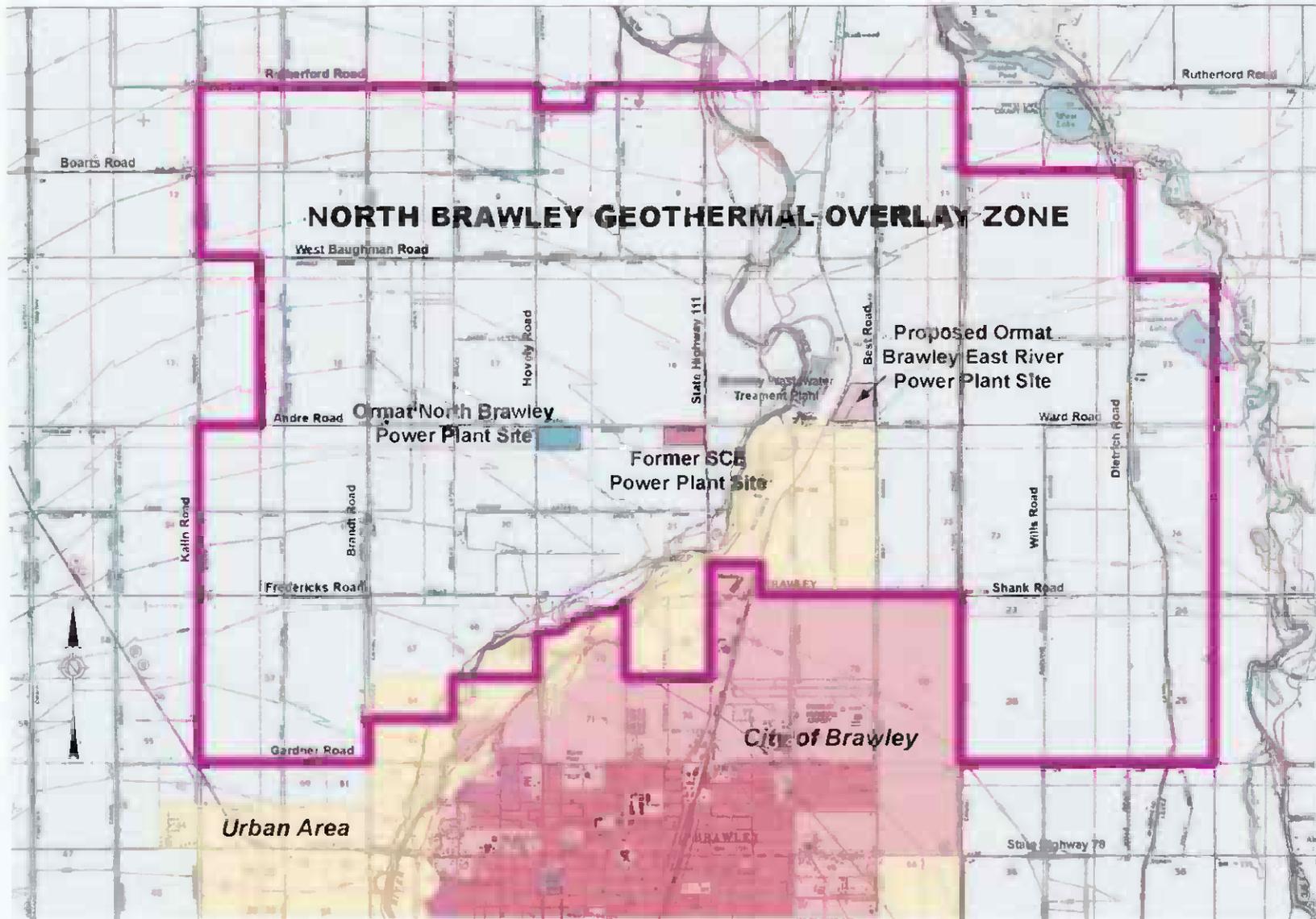


Figure 2: North Brawley Geothermal Overlay Zone Map Geothermal Wellfield – Brawley East River Development Project



- Proposed Geothermal Development Well Site: ●
- Approved Geothermal Exploration Well Site: ●
- Proposed Geothermal Pipeline Route: —
- Proposed Freshwater Pipeline Route: —
- Proposed New River Crossing: —

Project Area Extents
Shown on the Figure:

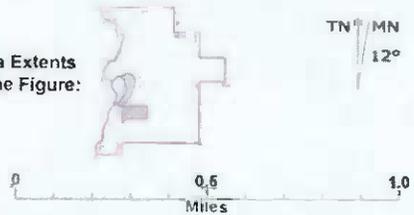


Figure 3: Geothermal Wellfield – East Brawley Development Project

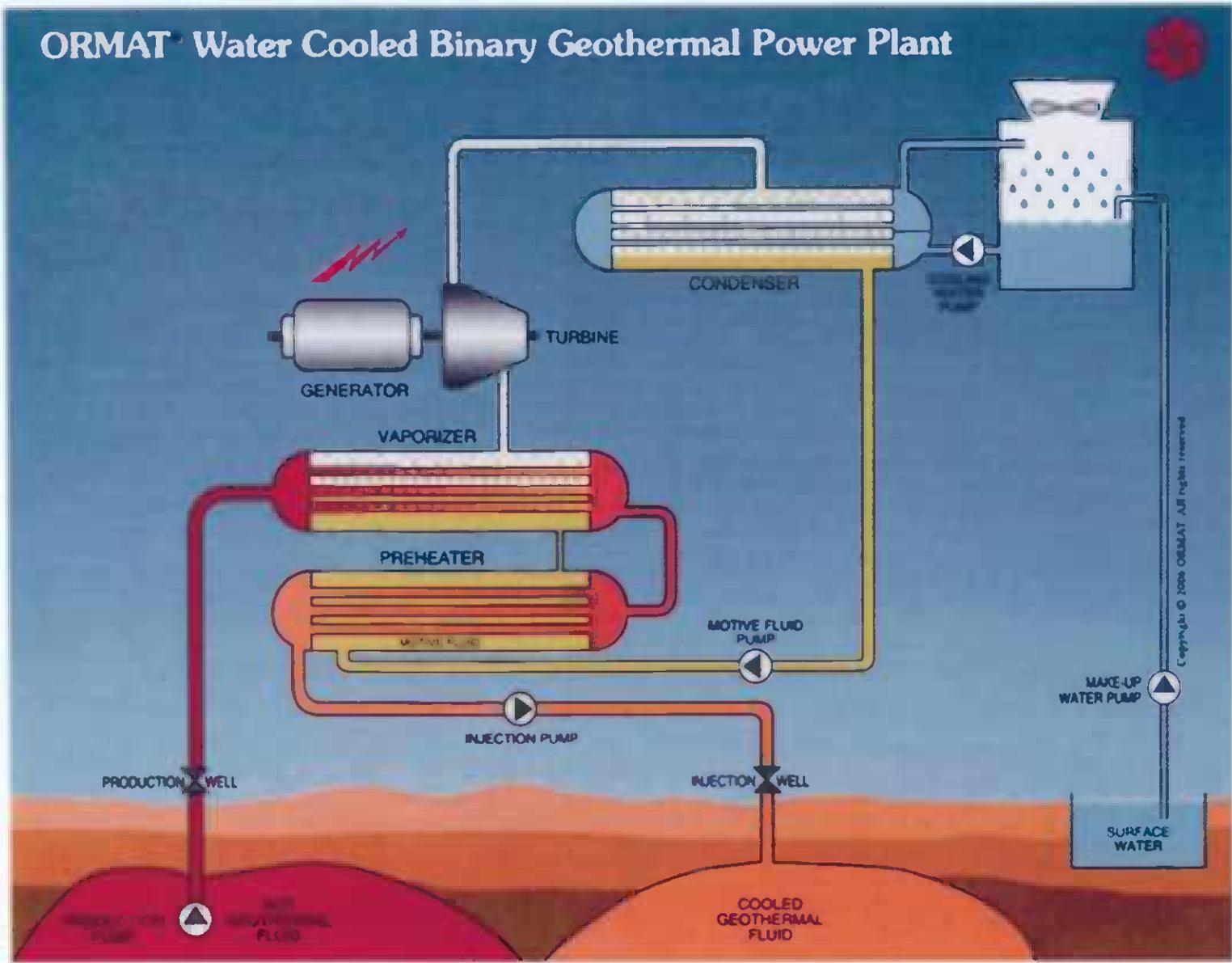
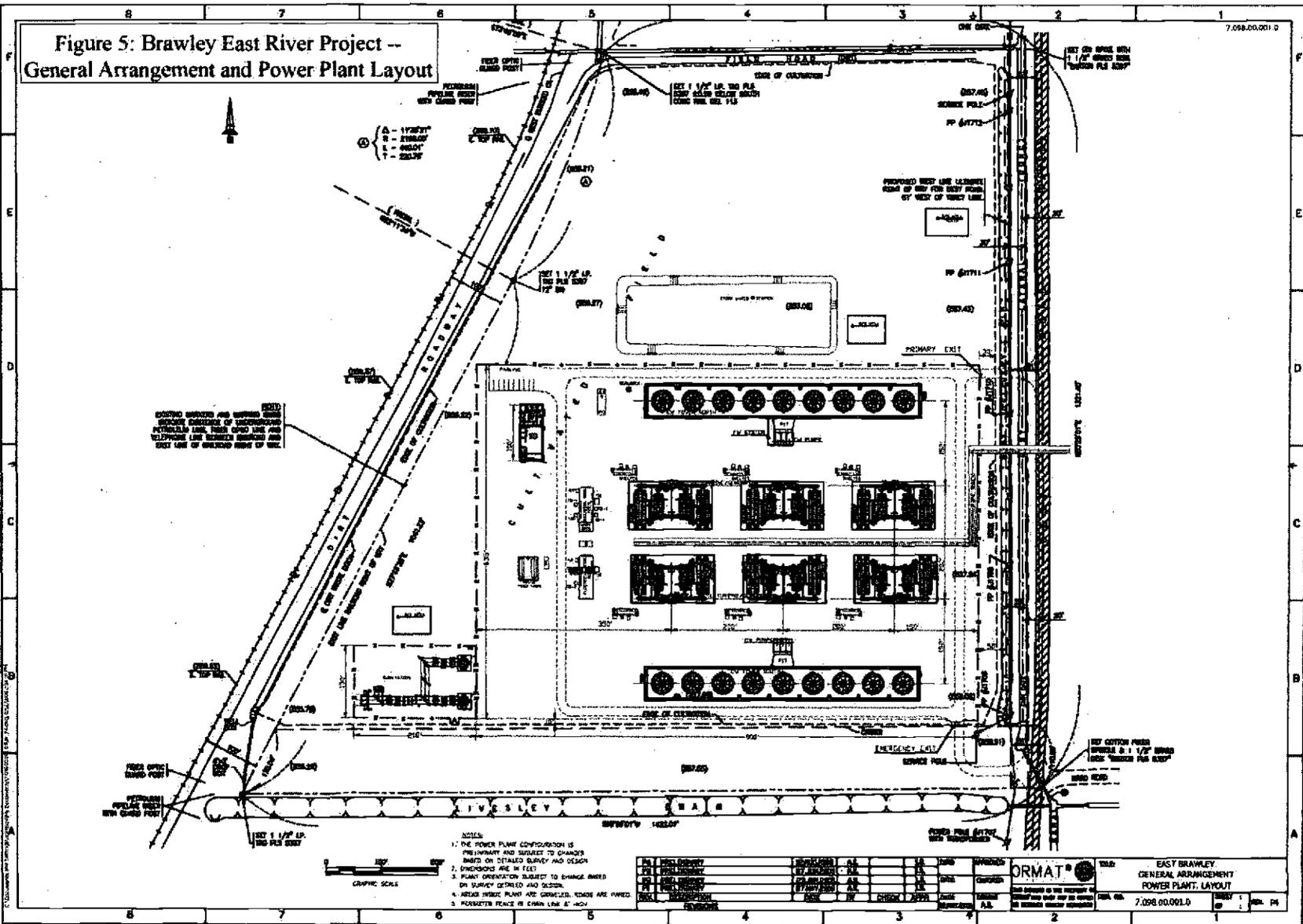


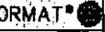
Figure 4: Schematic of Ormat Water Cooled Binary Geothermal Power Plant

**Figure 5: Brawley East River Project --
General Arrangement and Power Plant Layout**



- NOTES:
1. THE POWER PLANT CONFIGURATION IS PRELIMINARY AND SUBJECT TO CHANGE BASED ON DETAILED SURVEY AND DESIGN.
 2. DIMENSIONS ARE IN FEET.
 3. PLANT OPERATIONS SUBJECT TO CHANGE BASED ON SURVEY DETAILS AND DESIGN.
 4. AREAS WHERE PLANTS ARE GRAYED, ROAD IS PAVED.
 5. PERMITS PLACES IN CHAIN LINE AT HIGH.

NO.	DESCRIPTION	DATE	BY	CHECKED	APPROVED
1	DESIGN				
2	DESIGN				
3	DESIGN				
4	DESIGN				
5	DESIGN				
6	DESIGN				
7	DESIGN				
8	DESIGN				

ORMAT  **7.098.00.001.0**

**EAST BRAWLEY
GENERAL ARRANGEMENT
POWER PLANT LAYOUT**

DATE: 7.098.00.001.0

SCALE: 1" = 100'

PROJECT: EAST BRAWLEY

**TYPICAL WELL PAD LAYOUT DIAGRAM
BRAWLEY (EAST RIVER) GEOTHERMAL PROJECT**

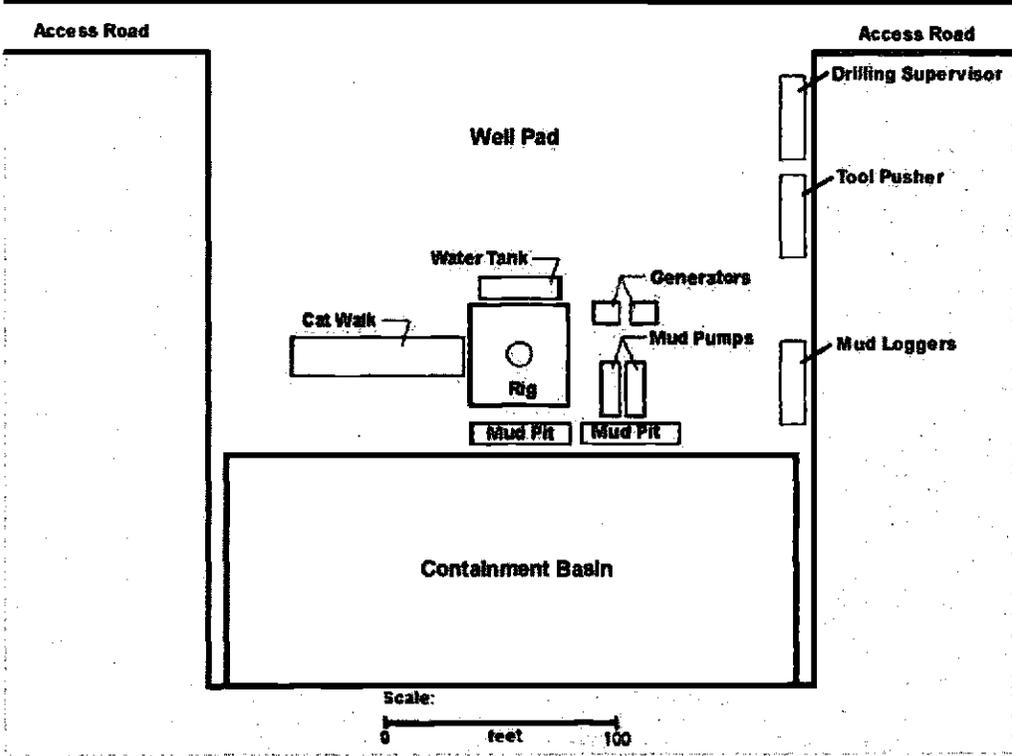


Figure 6: Typical Well Pad Layout Diagram



Figure 7: Proposed and Alternative Transmission Line Routes

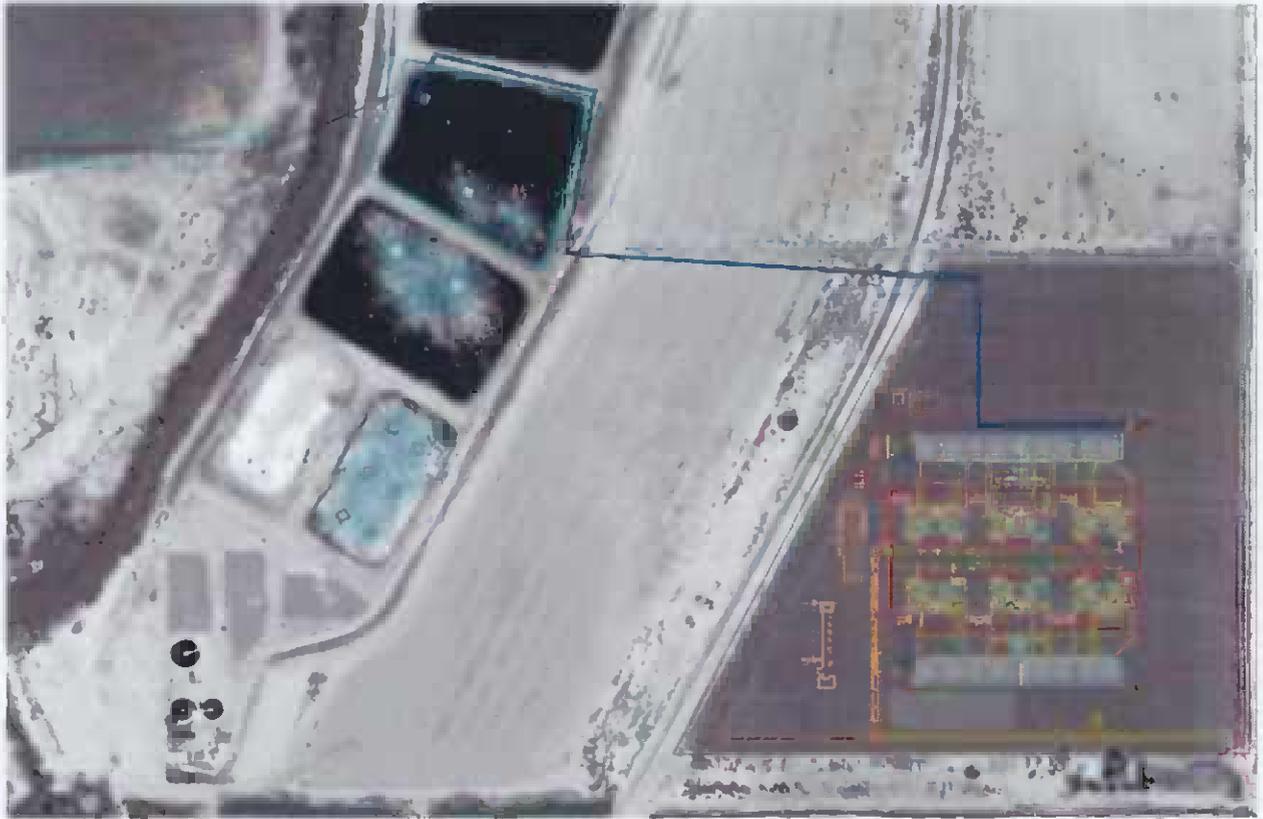


Figure 8: Proposed Tertiary Water Pipeline Route

EXHIBIT 20



CITY OF BRAWLEY

ADMINISTRATIVE OFFICES
383 Main Street
Brawley, CA 92227
Phone: (760) 351-3048
FAX: (760) 351-3088

April 14, 2011

Janet Laurain
Adams Broadwell Joseph & Cardozo
601 Gateway Blvd., Suite 1000
South San Francisco, CA 94080

Dear Janet:

Enclosed are the documents we believe are responsive to your public records act (PRA) request.

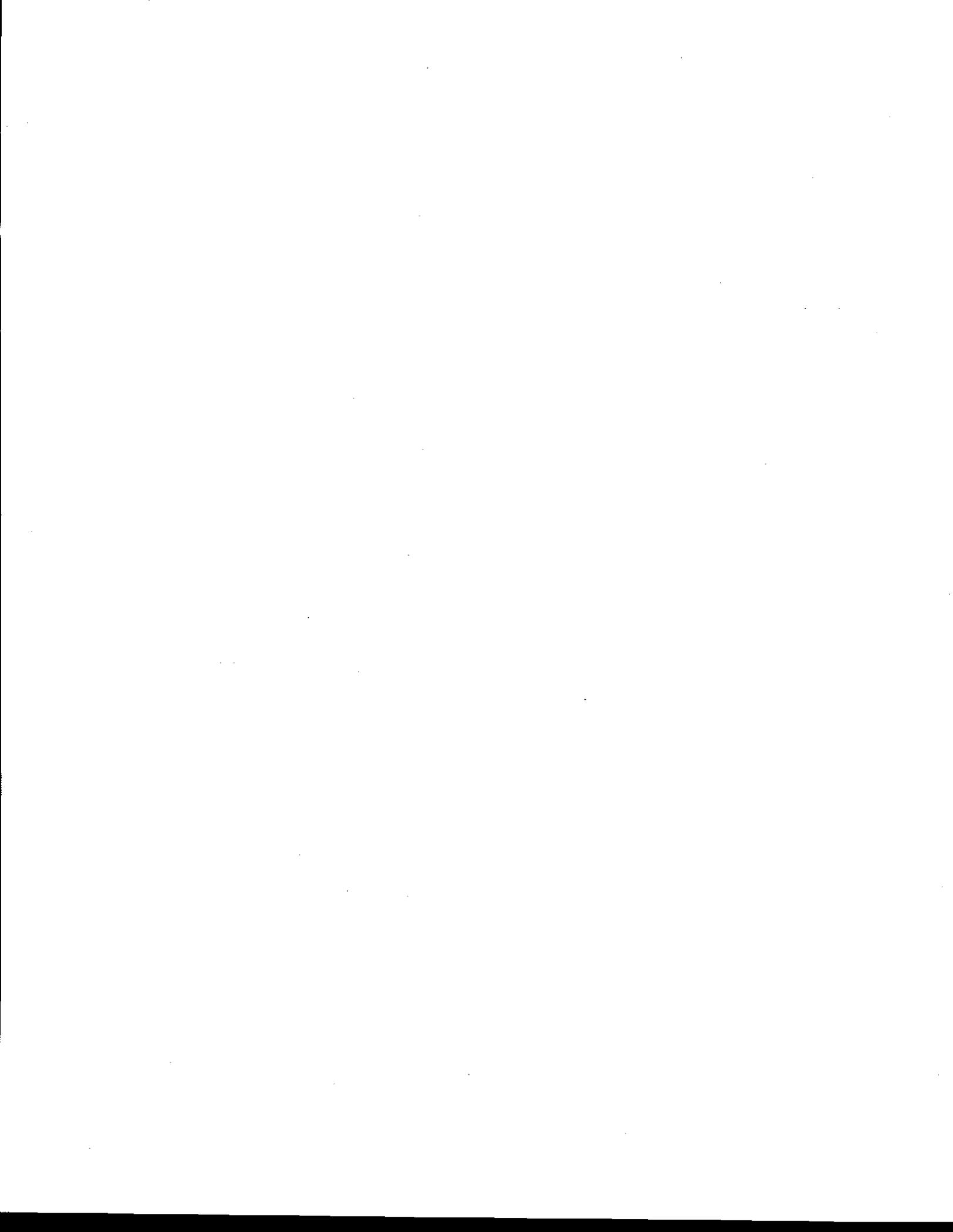
There are documents which fall in the preview of your request but are not included. Those documents consist of draft agreements which are the subject of ongoing discussion, but which have not been finalized or approved by the City Council. If and when such agreements are approved, they would be available under the PRA.

PRA sections we believe support non-disclosure at this juncture include Government Code Sections 6254(a), 6254(e), 6254.7(d), 6254.15 and 6255.

Sincerely,

Alma Benavides, IIMC
City Clerk

EXHIBIT 20





CITY OF BRAWLEY

ADMINISTRATIVE OFFICES

383 Main Street
Brawley, CA 92227
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Sincerely,

Alma Benavides, IIMC
City Clerk

1911
1912
1913

EXHIBIT 21



MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding ("MOU") is entered into as of October 6, 2009 by and between the City of Brawley, a California city ("City"), and Ormat Nevada, Inc., a Delaware corporation ("ONI").

RECITALS

A. ONI is a leading vertically integrated company dedicated to providing solutions for geothermal power, recovered energy generation and remote power.

B. The City owns and operates a municipal and industrial wastewater treatment plant. Pursuant to California Regional Water Quality Control Board Order No. R7-2005-0021, National Pollutant Discharge Elimination System Permit No. CA0104523, issued on June 29, 2005, the City is required to upgrade its wastewater treatment plant to secondary treatment and meet lowered effluent limitations.

C. The City and ONI wish to set forth the parameters by which each party may investigate the feasibility of pursuing the design, financing, development and operation of a tertiary wastewater treatment plant. Subject to the City's completion of its secondary wastewater treatment plant with a design capacity of 5.9 million gallons per day ("MGD"), ONI desires to plan, design, permit, build, finance and transfer a tertiary upgrade to the City's secondary wastewater treatment plant ("Project") for the City to operate.

D. Subject to each parties' approval of the agreements contemplated by this MOU and such other approvals as may be required by law, the City desires to operate the Project and sell, at a cost to be negotiated by the parties, all the treated effluent from the Project to ONI for beneficial use.

E. ONI and the City desire to enter into this MOU to set forth the terms and conditions for: (i) preparing the preliminary, conceptual design for the Project, obtaining necessary regulatory permits and conducting environmental review for the Project; (ii) negotiating and entering into a Project Development Agreement, which shall be based on the terms and conditions set forth in this MOU and provide for the final design, construction and financing of the Project, if approved; and (iii) negotiating and entering into an Operations Agreement for the Project, if approved.

F. The parties recognize and acknowledge all of the following: (i) no commitment can be made to carry out any project unless and until the environmental review and assessment required by the California Environmental Quality Act ("CEQA") has been completed; and (ii) for the purposes of this MOU, projects that may require CEQA compliance include: (a) the City's approval of the Project Development Agreement for the final design, construction and financing of the Project; (b) construction and operation by the City of a secondary wastewater treatment plant; and (c) construction and operation by ONI or the City of the Project, none of which shall be effective unless and until the environmental review and assessment required by CEQA has been completed.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals and other covenants and conditions contained herein, the sufficiency and adequacy of which are hereby acknowledged, the parties hereto agree as follows:

1. **Secondary Wastewater Treatment.** The parties acknowledge and agree that, based upon legal requirements that are independent of this MOU, the City is planning, designing, permitting, financing and constructing a secondary wastewater treatment plant with an estimated completion date of December 2011.

2. **Tertiary Wastewater Treatment.** Pursuant to this MOU, ONI will prepare the conceptual design, obtain permits and conduct environmental review for the Project in accordance with the terms and conditions set forth herein and all applicable laws.

2.1 **Design.** ONI shall create the conceptual design for the Project based upon a design capacity of 5.9 MGD and secondarily-treated inflow quality data provided by the City. The City shall provide such data to ONI according to the schedule in Exhibit A. The City shall review and approve the engineering aspects of the conceptual Project design prepared by ONI, which approval shall not be unreasonably withheld or delayed. The conceptual design will then serve as the basis for environmental review of the Project under CEQA.

2.2 **Permitting.** ONI shall be responsible for, and shall exercise reasonable efforts to acquire, all regulatory permits needed for construction of the Project; except that ONI shall not be required to continue seeking permits if ONI determines that the Project is infeasible or permits are unlikely to be obtained on reasonable terms and conditions. The City shall be responsible for, and shall exercise reasonable efforts to acquire, all regulatory permits needed for operation of the Project. Each party agrees to cooperate in good faith to assist the other party in obtaining all regulatory permits described above.

2.3 **Environmental Review.** The City shall act as the lead agency for environmental review of the Project in accordance with Section 7 of this MOU. The City retains its discretion to independently, fully and fairly evaluate each approval and environmental documentation prepared pursuant to CEQA.

3. **Exclusivity.** The City shall work exclusively with ONI to plan and design the Project and negotiate the definitive Project Development Agreement and Operations Agreement as further described herein, for a period of twenty-four (24) months from execution of this MOU (the "Exclusive Period"). The Exclusive Period may be extended for up to two (2) additional one (1) year terms upon written notice by one party to the other party at least thirty (30) days prior to the then-applicable ending date of the Exclusive Period. This section 3 is not subject to section 6, as the parties fully intend this section 3 to have a binding effect.

4. **Project Development Agreement.** During the Exclusive Period, the parties shall negotiate in good faith the terms of a Project Development Agreement related to the Project, with the following general terms. The Project Development Agreement will be considered for approval following the completion of all environmental review required under CEQA.

4.1 Real Property for Project. The parties shall agree on the City's provision of all real property, rights-of-way for utilities and access as reasonably required for the Project including, if feasible, locating the Project on the same parcel as or reasonably adjacent to the City's wastewater treatment plant.

4.2 Final Design. ONI shall be responsible for the final design of the Project. The final design shall conform to the conceptual design prepared pursuant to Section 2.1 and enable the Project to meet all regulatory standards, including but not limited to Title 22, California Code of Regulations section 60306(a) as amended. The City shall review and approve the final Project design prepared by ONI based on engineering standards, which approval shall not be unreasonably withheld or delayed.

4.3 Construction, Finance and Testing. ONI shall be responsible for the construction and finance of the Project if approved. Upon completion of construction of the Project, ONI shall conduct operational tests for the Project to ensure that it operates to meet all standards set forth in Section 4.2. The City agrees to cooperate in good faith with ONI for all operational tests. Once all tests have been successfully completed, ONI shall certify that the Project is operational and deliver notice of such certification to the City, the date of which shall be the "Certification Date." The City reserves the right to inspect the project during construction and ONI will respond to the City's comments in good faith.

4.4 Warranty. ONI agrees to provide the City with a limited time materials and workmanship warranty for the Project.

4.5 Training. ONI agrees to provide training to City employees prior to commissioning of the Project, at no cost to the City, and provide technical support for a period of up to (30) days following the Certification Date.

4.6 Dedication. As of the Certification Date, ONI agrees to offer the Project to the City, at no additional cost, in accordance with the terms and conditions of the Project Development Agreement and Operations Agreement. Upon ONI's completion of construction of the Project in accordance with ONI's obligations hereunder, the City agrees to accept ONI's offer of the Project subject to any terms and conditions agreed to in the Program Development Agreement. The City thereafter shall own the Project and shall be responsible for all costs resulting from or associated with ownership, operation, maintenance, repair, replacement and improvement of the Project and the delivery of project effluent to ONI pursuant to the Operations Agreement described in Section 5.

5. Operations Agreement. During the Exclusive Period, the parties shall negotiate in good faith the terms of an Operations Agreement related to the Project, with the following general terms. The Operations Agreement will be considered for approval following the completion of all environmental review required under CEQA.

5.1 Term. The term of the Operations Agreement shall be 30 years commencing as of the Certification Date ("Term"), and may be extended based on terms established by the parties in the Operations Agreement.

5.2 Operations and Maintenance. The City shall operate, maintain, repair, replace and improve the Project as needed for Project effluent to meet the water quality standards set forth in Section 4.2. ONI agrees to pay the City for all operations and maintenance expenses actually and reasonably incurred for the Project according to a mechanism agreed upon by the parties in the Operations Agreement. ONI shall have the right to inspect, audit and comment on the operation and maintenance of the Project, and the City shall consider such comments.

5.3 Delivery of Effluent. In return for ONI's investment in the Project and ONI's payment of operation and maintenance costs as described in section 5.2 above, the City agrees to deliver all treated effluent produced by the Project to ONI at a cost to be determined in and in accordance with the terms and conditions set forth in the Project Development Agreement and the Operations Agreement.

5.4 Abandonment. At the end of the Term, the City will be free to utilize the treated effluent as it wishes and agrees to be wholly responsible for the Project, including, as deemed appropriate by the City, the abandonment and reclamation of the Project at the City's sole expense.

6. Nonbinding Effect of MOU. This MOU is a memorandum of understanding only. There is no legally binding or enforceable contract between the parties pertaining to the subject matter of this MOU, and statements of intent or understandings in this MOU do not constitute an offer, acceptance or legally binding agreement and do not create any rights or obligations for or on the part of any party to this MOU. The parties intend to negotiate definitive agreements in the Project Development Agreement and Operations Agreement described in Sections 4 and 5 of this MOU, to supplement the provisions of this MOU.

7. Compliance with California Environmental Quality Act.

7.1 Lead Agency. As the agency with the greatest responsibility for subsequent approvals that constitute the Project, the City shall be lead agency for the Project under this MOU pursuant to California Public Resources Code section 21067 and CEQA Guidelines section 15051.

7.2 Environmental Review and Analysis. ONI shall retain a qualified consultant or consultants to conduct the environmental review of the Project, subject to approval by the City of such consultant/s, which approval shall not be unreasonably withheld. As lead agency, the City will first consider whether the Project is exempt under CEQA. If the Project is not exempt, ONI and its consultant/s will prepare an initial study for independent review by the City to determine whether the Project may have a significant effect on the environment. The City will then determine if a negative declaration, mitigated negative declaration or environmental impact report ("EIR") will need to be prepared for the Project. ONI and its consultant/s will be responsible for preparing any documentation required under CEQA. If an EIR is prepared for the Project, ONI and its consultant/s will prepare the EIR to include all analysis required by law, including identification and meaningful evaluation of: (i) a range of reasonable alternatives to the Project that could feasibly attain the basic objectives of the Project; (ii) feasible mitigation measures that would lessen any significant adverse effects of that Project; and (iii) a no Project alternative. The City shall exercise its independent judgment in considering

the environmental document prepared and shall independently, fully and fairly evaluate whether it complies with CEQA.

7.3 Cooperation of Parties. The parties will cooperate with each other, in good faith and as needed, to conduct a thorough and legally sufficient CEQA review of any project pursuant to this MOU.

7.4 Discretion of the City. The City retains its discretion to independently, fairly and fully evaluate the Project and environmental documentation prepared pursuant to CEQA. Prior to final approval or implementation of the conceptual design of the Project, the Project Development Agreement or the Operations Agreement, the City, as lead agency, shall consider the environmental documentation prepared pursuant to CEQA. If an EIR is utilized and (1) identifies significant adverse impacts that can be reduced to a less than significant level through the adoption of feasible alternatives and/or mitigation measures, or (2) identifies significant adverse impacts that cannot be reduced to a level that is less than significant, the City shall have complete discretion, subject to the requirements of CEQA, to determine whether to adopt such alternatives and/or feasible mitigation measures and whether to approve the Project notwithstanding one or more significant environmental impacts together with a statement of overriding considerations, as the case may be.

8. Confidentiality.

8.1 Background. The parties wish to have discussions so that they can further evaluate a potential business relationship relating to the Project and negotiate the Project Development Agreement and Operations Agreement. During such discussions, it may be necessary for ONI to disclose to the City certain information which ONI considers to be confidential information.

8.2 Disclosure. ONI acknowledges and agrees that information submitted to the City pursuant to this MOU may be subject to compulsory disclosure by the City upon request from a member of the public under the California Public Records Act, Government Code sections 6250 *et seq.* The City recognizes and agrees that certain information that may be disclosed by ONI or that ONI may be required to submit to the City may be considered confidential and proprietary by ONI. ONI shall specifically and clearly designate as "CONFIDENTIAL" all materials that it wishes the City to withhold from public disclosure. The City agrees not to voluntarily disclose any materials so designated to persons other than officials, attorneys, employees and consultants of the City involved in review of the Project.

8.3 Third Party Requests. If the City receives a request from a third party to review or copy material designated as confidential, to the maximum extent legally justifiable, it will inform the third party that the material is entitled to an exemption from disclosure under one or more of the following sections of the Public Records Act: (i) section 6254(e) exemption for utility systems development; (ii) section 6254.7(d) exemption for trade secrets; (iii) section 6254.15 exemption for corporate financial and proprietary information; and (iv) other exemptions that the City determines may be applicable. If the person who requested the information files a legal action seeking its release, the City will advise ONI and will not oppose a motion by ONI to intervene in the action. ONI must either intervene and assume defense of the

action at its sole cost or agree to pay the City's legal expenses in defending the action; otherwise, the City will have no obligation to affirmatively defend the action and may release the information sought without any liability whatsoever to ONI. ONI shall hold the City harmless from any damages, costs or expenses, including, but not limited to, any award of the other party's costs and legal expenses.

9. General Provisions.

9.1 Approvals. The parties acknowledge that there may be third-party approvals required for implementation of this MOU. The parties agree that the party needing such an approval will exercise good faith and reasonable efforts to obtain the approval when required, and the other party agrees to cooperate in good faith and with reasonable efforts to assist the party seeking approval.

9.2 No Third Party Rights. There are no third party beneficiaries to this MOU, except for permitted successors and assigns.

9.3 Severability. Any provision of this MOU found now or later to be illegal or against public policy shall be modified or changed by the parties to the extent possible to carry out the intent of this MOU. The remaining provisions shall remain in full force and effect and shall not be impaired or invalidated thereby.

9.4 Remedies. As remedies at law will be inadequate, each party is entitled to specific performance, injunctive and other equitable relief in case of any breach or attempted breach, and waives any requirement for bond. No remedy or election shall be deemed exclusive but shall, wherever possible, be cumulative with all other remedies at law or in equity.

9.5 No Assignment. No party may assign, transfer or otherwise dispose of this MOU in whole or in part without the prior written consent of the other party; except, that ONI may assign its rights and responsibilities under this MOU to an affiliated entity.

9.6 Governing Law. This MOU shall be governed by and construed in accordance with the internal laws of the State of California.

9.7 Time of the Essence. Time is of the essence in respect to all provisions of this MOU that specify a time for performance; provided, however, that the foregoing may not be construed to limit or deprive a party of the benefits of any grace or use period allowed in this MOU.

9.8 Legal Costs. If any party to this MOU shall take any action to enforce this MOU or bring any action or commence any arbitration for any relief against any other party, declaratory or otherwise, arising out of this MOU, the losing party shall pay to the prevailing party a reasonable sum for attorney and expert fees and costs incurred in taking such action, bringing such suit or enforcing any judgment granted therein, all of which shall be deemed to have accrued upon the commencement of such action and shall be paid whether or not such action is prosecuted to judgment. Any judgment or order entered in such action shall contain a specific provision providing for the recovery of attorney and expert fees and costs due hereunder. The amount of such fees and costs shall be determined by a court of competent

jurisdiction and not by a jury. For the purposes of this Section, attorney and expert fees and costs shall include, without limitation, fees incurred in the following: (i) post judgment motions; (ii) contempt proceedings; (iii) garnishment, levy, debtor and third party examinations; (iv) discovery; (v) bankruptcy litigation; and (vi) appeals.

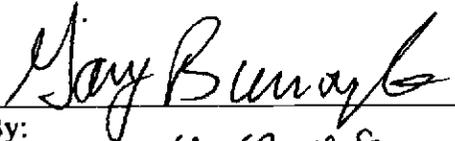
9.9 Authorizations. All individuals signing this MOU warrant they are authorized on behalf of any indicated entity and will indemnify, defend and hold harmless the other parties, from all damages, costs and attorney fees, if not so authorized.

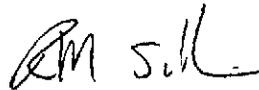
9.10 Execution in Counterparts; Signature. This MOU may be executed in counterparts, each of which shall be deemed an original (including copies sent to a party by facsimile transmission or PDF) as against the party signing such counterpart, but which together shall constitute one and the same instrument. This MOU may be executed by faxed or scanned and emailed signatures.

IN WITNESS WHEREOF, the parties have executed this MOU as of the date first stated above.

CITY OF BRAWLEY

**ORMAT NEVADA, INC.,
A Delaware corporation**


By: _____
Date: 10-19-09


By: _____
Date: 19 OCT 09

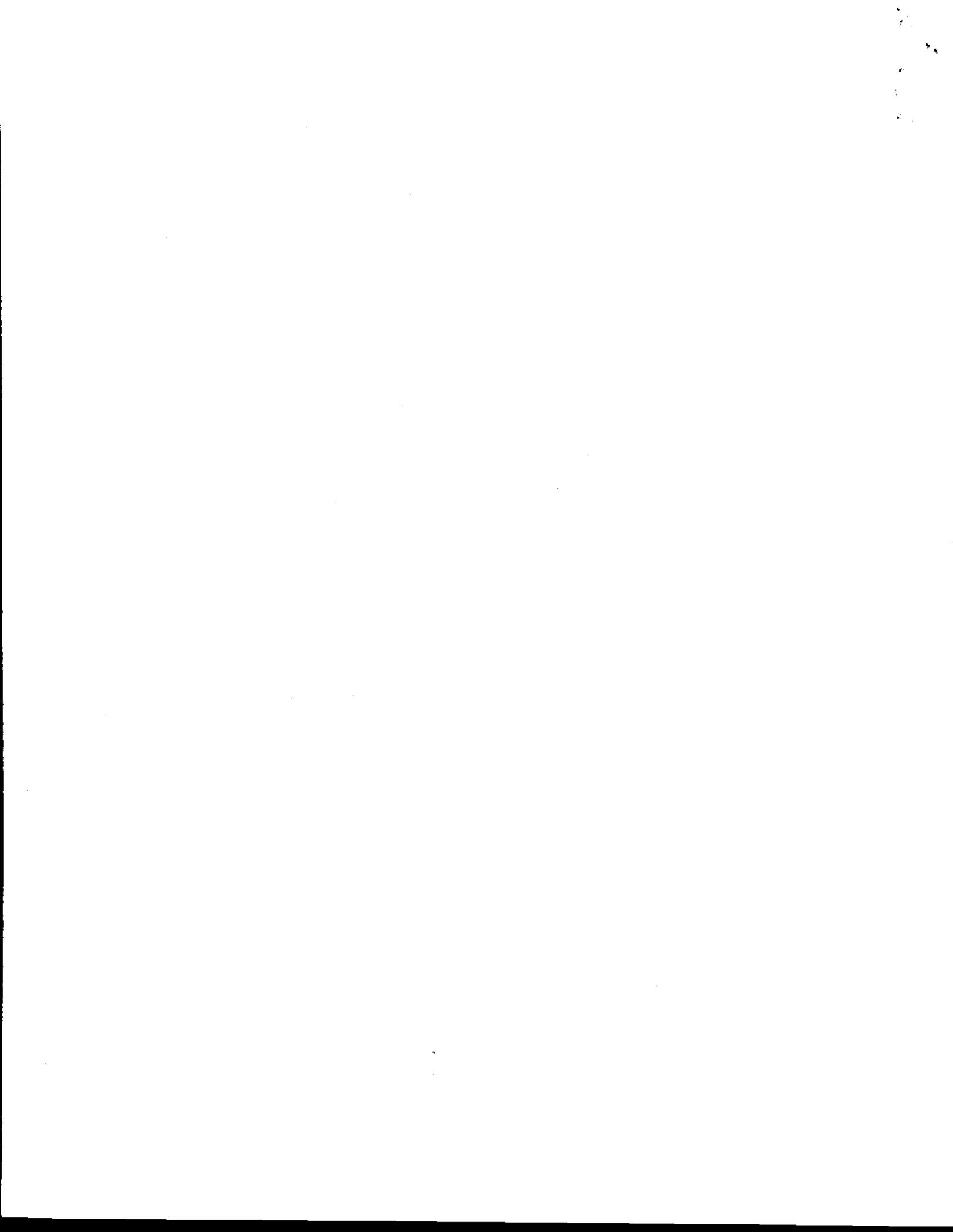


EXHIBIT 22



**BRAWLEY WASTEWATER TREATMENT PLANT
TERTIARY TREATMENT FACILITY
CONCEPTUAL DESIGN REPORT**

1 INTRODUCTION

Ormat Nevada, Inc. (Ormat) currently utilizes canal water from the Imperial Irrigation District to provide make-up water to the cooling towers of the existing geothermal power generation facilities. Ormat is interested in reducing its use of canal water, and has commissioned this report to evaluate the use of effluent from the City of Brawley Wastewater Treatment Plant (WWTP) for use in the cooling tower make-up water at the East Brawley and North Brawley facilities. A tertiary treatment facility will be required to meet the performance objectives of the California Recycled Water Criteria (Disinfected Tertiary Title 22 Recycled Water) for direct use in open recirculating cooling water systems as well as water quality requirements specific to cooling water system operation.

The City of Brawley is currently upgrading the Waste Water Treatment Plant (WWTP) secondary system by replacing the existing lagoons with an extended aeration pond system employing wave oxidation technology that will provide full nitrification and denitrification. The plant upgrade includes new secondary clarifiers, aeration blowers, sludge dewatering and drying, new yard piping, electrical distribution and control systems.

Following is the conceptual design of the tertiary treatment system as developed and proposed by Ormat.

This design is the basis being used for design reviews by consultants and contractors in order to develop a final design. This conceptual design is intended to provide sufficient information for understanding environmental impacts and general parameters of final design with potential to change based on design reviews.

2 PROJECT VICINITY AND LOCATION MAPS

The tertiary treatment facility will be located on the City of Brawley WWTP. The City of Brawley WWTP is located at 1550 Best Road in the City of Brawley as shown Figure #1 – Vicinity and Location Maps.

3 PROJECT DESCRIPTION

The proposed tertiary treatment system will have a capacity of 5.9 mgd. As of 2008, existing Brawley WWTP average dry weather flows were 3.9 mgd. Therefore, the tertiary treatment system will operate at the initial available flow rate of 3.9 mgd but increase over time to 5.9 mgd as dry weather flow increases.

The new tertiary treatment system will receive water from the Secondary Effluent Diversion Structure which is being installed together new secondary system. The Secondary effluent flow will be diverted from the 42-inch pipeline to the Tertiary Influent Pump Station wet well. From the wet well, water would be pumped into a flash mixing chamber for alum addition. Alum or Ferric Chloride will be added using a high-energy direct-vacuum induction or pump diffusion system for near instantaneous and homogenous mixing.

Following flash mixing, the water will overflow into two (2) parallel flocculation and sedimentation trains. Flocculation will be based on a two-stage design. The first stage will provide greater mixing energy to begin particle agglomeration and floc formation. The second stage will impart less energy to avoid shearing and encourage continued growth of large settleable floc. After the flocculation chambers, water will flow into the rectangular sedimentation tanks. The majority of the suspended solids will be removed in the sedimentation basin and the supernatant will be collected via weirs from the top of the sedimentation basin. The supernatant would then flow into the multi-media filter by gravity. A polymer will be added to the water as needed to increase filter performance and minimize filtered effluent turbidity. The gravity multi-media filter would have four filtration cells operating in parallel with sand and anthracite media. The filtered water would be collected in the Filter Effluent Distribution Box.

The Filter Effluent Distribution Box will be designed with a two-way weir system that will allow the filtered water to flow into the Filter Backwash Supply Storage Sump, or to the Chlorine Contact Basin. Sodium hypochlorite will be injected at the dosage of 5 mg/L and the chlorine contact tank will provide two hours of detention time at 5.9 MGD to achieve the minimum 90 minute modal contact time required by Title 22. Once the water is disinfected by the Chlorine Contact Basin, the water would gravity flow into a storage equalization pond. The equalization pond would hold approximately 6.0 million gallons to provide an operational buffer in case of WWTP or tertiary system interruptions, or Power Plant operational disruptions. An Effluent Pump Station Wet Well would receive the water from the equalization pond and supply the water to Ormat's Power Plant. If required, it would be possible to inject Sodium hypochlorite at a dosage of 2 mg/L into the effluent pump station discharge pipe in order to maintain a residual disinfectant. The free chlorine residual will be monitored and analyzed downstream of the injection point. A flow schematic for the normal operations in dry weather conditions is presented in Figure #2 – Process Flow Schematic.

If the tertiary system operations are disrupted for a brief amount of time, the secondary effluent would be diverted to the existing UV disinfection system and flow into the New River instead of the tertiary treatment process. In this short period the water demand at the East Brawley Plant would be met by utilizing the equalization storage. Any secondary effluent excess flow above 5.9 MGD would also flow to the New River through the existing UV disinfection system.

A flow schematic showing the described temporary wet weather operations is presented in Figure #3 – Wet Weather Flow.

As part of the normal dry weather tertiary operation, the Filter Effluent Distribution Box will allow the filtered effluent to flow into the Filter Backwash Supply Storage Sump. The weir height will be equivalent to the weir height that controls flow to the Chlorine Contact Basin. This would keep the Filter Backwash Supply Storage Sump full at all times. The sump would have the capacity to store water to satisfy two sequential filter backwash cycles without interrupting normal tertiary treatment system operation. The Filter Backwash Supply Pumps would convey the stored backwash supply water to the media filter at a higher rate to provide cleaning, fluidization and restratification of the media. The backwash wastewater would then be collected and conveyed back to the Influent Pump Station Wet Well.

Alum/Ferric sludge will be collected from the sedimentation basin using a chain and flight system and conveyed to a sludge holding tank. The sludge pumps will convey the collected sludge to a new centrifuge system. One new centrifuge will be installed near the existing centrifuge. A new polymer system would be utilized at the new centrifuge system to increase the dewatering efficiency. The filtrate from the centrifuge would then be recirculated to the Tertiary Influent Pump Station wet well and the solids from the centrifuge would be collected and transferred to solids drying beds for further dewatering. Once the water content of the dried solids is reduced below 50%, the solids will be hauled off to a landfill for final disposal.

Chemical storage, feed systems, and electrical distribution and control system will occupy separate areas in a common building. The chemical area will house the following chemical feed and storage systems:

- Alum
- Caustic
- Sulfuric Acid
- Sodium Hypochlorite
- Polymer (Flocculation)
- Polymer (Dewatering)
- Sodium Bisulfite

4 EFFLUENT WATER QUALITY REQUIREMENTS

The total permitted design capacity of the WWTP will be 5.9 mgd. Ormat desires to use tertiary effluent from the Brawley WWTP for the use in evaporative cooling towers. Therefore, the tertiary treatment water must meet the requirements of Title-22 disinfected tertiary recycled water. The cooling tower make-up water requirements and water quality objectives for the East Brawley Power Plant are presented in the following Tables.

Tertiary Effluent Water Quality Objective

pH	pH Unit	< 7.9	6.0 – 8.0
TDS	mg/L	< 1,200	< 1,700
Total Alkalinity	mg/L as CaCO ₃	<300	< 300
Chloride	mg/L as Cl	450	450
Sulfate	mg/L as SO ₄	300	< 600
Total Hardness	mg/L as CaCO ₃	370	< 500
Calcium Hardness	mg/L as CaCO ₃	220	< 300
Ortho-Phosphate	mg/L as PO ₄	11	1.1 – 2.6
Total Phosphate	mg/L as PO ₄	12	1.4 – 3.1
Silica	mg/L as SiO ₂	14	< 40
Total Iron	mg/L as Fe	0.25	< 0.3
Copper	mg/L as Cu	0.016	< 0.14
Aluminum	mg/L as Al	0.2	< 0.4
TSS	mg/L	< 20	< 2
Free Chlorine	mg/L as Cl ₂	0.0	0.2 – 1.0
Total Coliform	MPN/100ml	TNTC	2.2

5 CONCEPTUAL DESIGN CRITERIA

The conceptual design criteria for the Brawley Tertiary Treatment System are summarized in the following Table.

Pretreatment	
Flash Mix	HRT: 40-50 seconds Dimensions: 6' (L) x 6' (W) x 12' (D), 3' freeboard Volume: 3200 gallons Flash Mix Pump: 200 gpm Coagulant Dosage: 50-150 mg/L Alum (100% strength) pH adjustment capability: caustic and sulfuric acid
Flocculation	2 parallel trains, 2 stages each HRT at design flow, each stage: 17-18 minutes Volume each stage: 36,000 gallons Dimensions each stage: 20' (L) x 20' (W) x 12' (D), 3' freeboard Mixers: 4- 25 HP, 2-speed motors
Sedimentation	2 parallel basins Overflow Rate: 1 gpm/sf Volume each stage: 180,000 gallons Dimensions: each 100' (L) x 20' (W) x 12' (D), 3' freeboard Effluent Weir Loading: 20,000 gpd/ ft; 150 LF each basin Chain and flight sludge collection
Chemical Feed and Storage Facilities	Alum Storage: 1 x 15,000 gal tank Polymer Storage: 2 x 55 gal tanks Caustic Storage: 1 x 2,000 gal tank Sulfuric Acid Storage: 1 x 100 gallon tank Chlorine (Sodium Hypochlorite) Storage: 2x 3,000 gal tanks Alum Dosing Equip: 1 gpm Building Dimensions (Portion of Combined Chem/Elect Bldg): 50' (W) x 80' (L)
Filtration	
Gravity Multi-Media Filtration System	No. of Filters: 4 Filtration Rate: 4 gpm/ft ² w/1 unit offline Dimensions(each): 18.5' (L) x 18.5' (W) x 17' (H) Max BW rate: 5200 gpm
Backwash Waste Stream	Max. Daily volume: 160,000 gallons Equalization Volume: 120,000 gallons
Backwash Waste Return Capacity	200 gpm
Pumping	
Tertiary Inlet Pump Station	3 vertical centrifuge 480V motors 2 duty with VFD +1 standby (without VFD) Design Flow: 2,100 gpm each
Backwash Supply Pumps	3 vertical centrifuge 480V motors 2 duty with VFD +1 standby (without VFD) Design Flow: 2,500 gpm each
Tertiary Effluent Pump Station	3 vertical centrifuge 480V motors 2 duty with VFD +1 standby (without VFD) Design Flow: 2,100 gpm each

6 PROJECT LAYOUT

The proposed site layout for the preferred project is shown in the Figure #4 – Site Plan Layout, for the centrifuge system in Figure #5 – Centrifuge and Solids Drying Beds Layout and for the disinfected tertiary effluent pump station in Figure #6 – Yard Piping and Pump Station Layout.

The major treatment equipment would be located in Pond S2 (second pond from the north). The new tertiary system centrifuge would be located adjacent to the existing centrifuge for the secondary sludge. The 6.0 MG equalization pond would be located within the existing Pond S3 (the most northern pond) and the tertiary effluent pump station would be located at the southwest corner of this pond. An access road has been designed around the tertiary treatment plant for ease of access and maintenance. The southeast corner of Pond S2 would be filled and the electrical equipment and chemical feed system would be located in this area. Both the electrical equipment and the chemical feed system would be in an air conditioned building. This building is located on the fill at a higher elevation to prevent any flood damage in case of a storm.

The preliminary hydraulic profile of the conceptual design is shown in Figure #7 – Hydraulic Profiles.

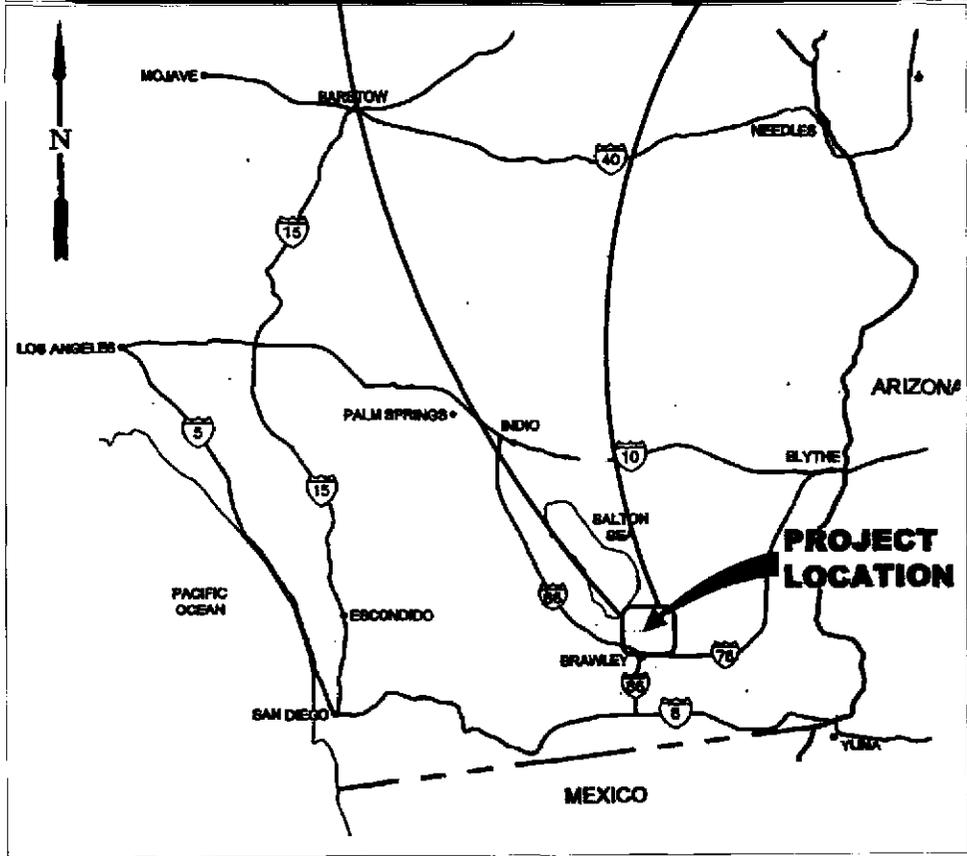
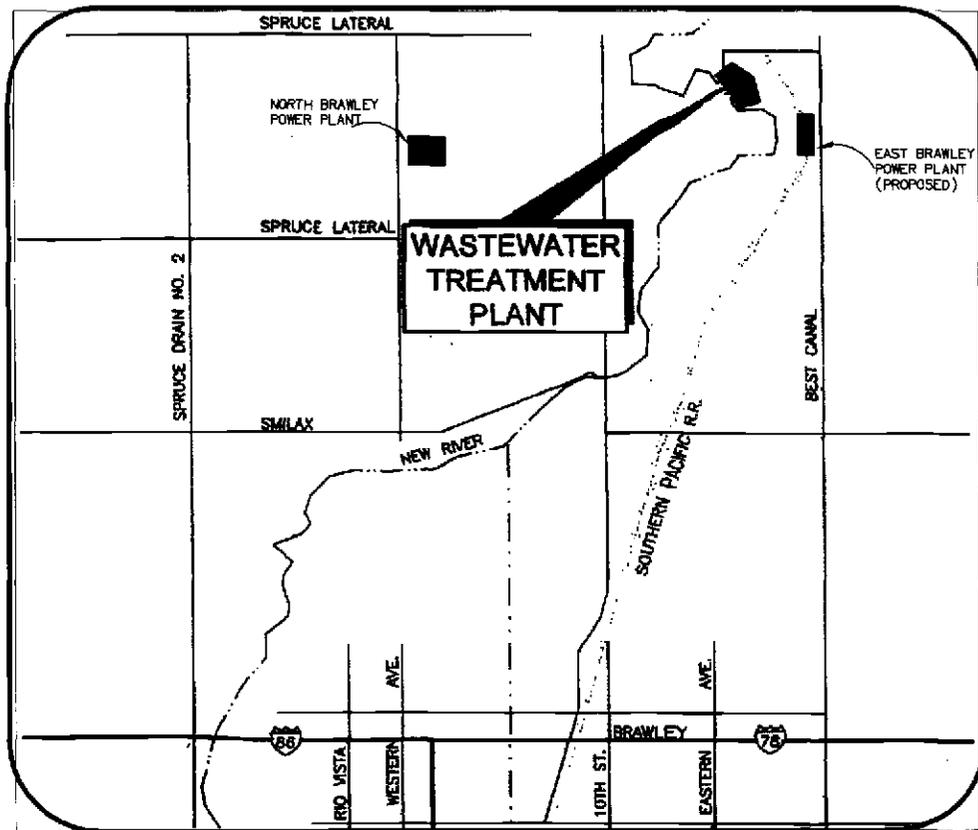
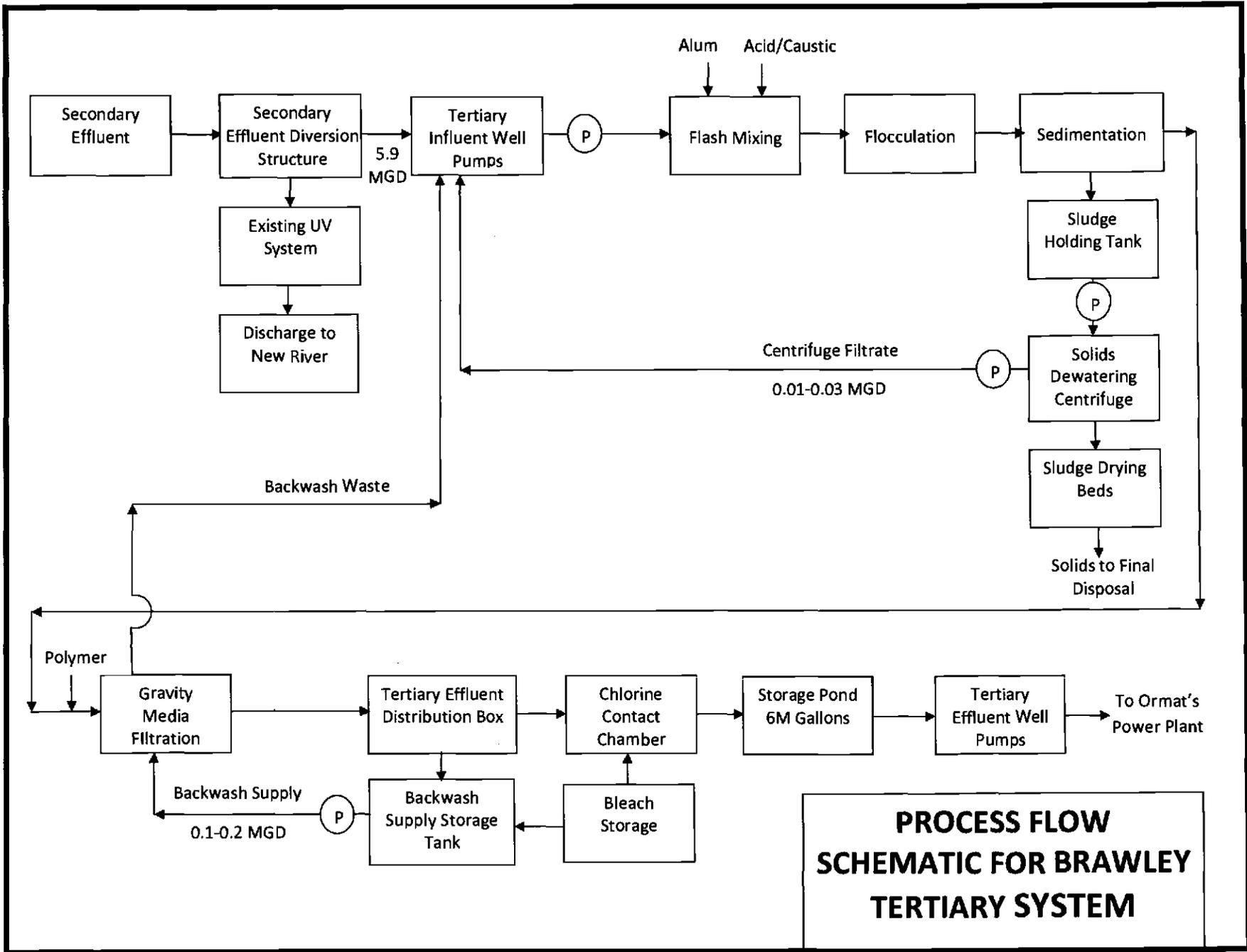
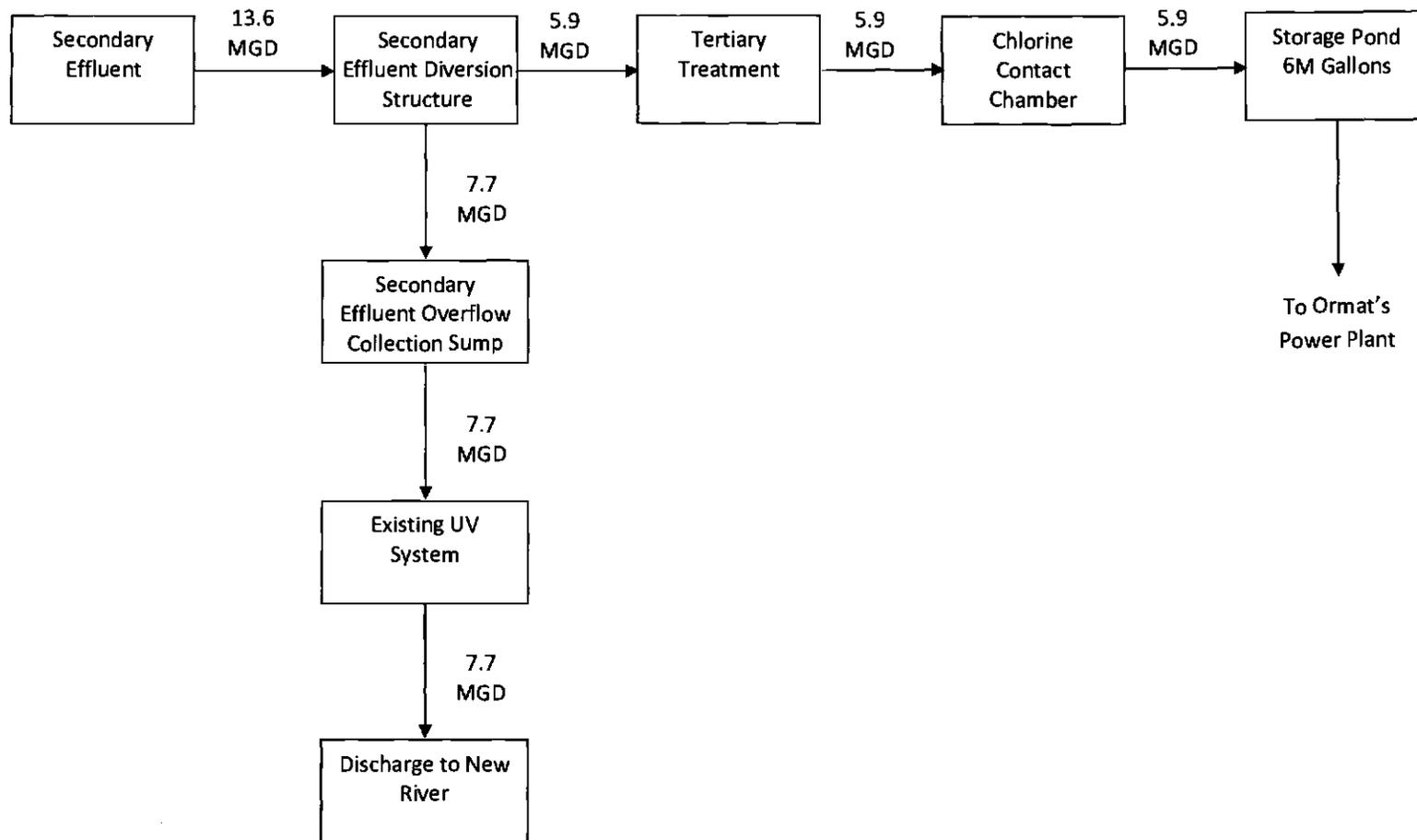


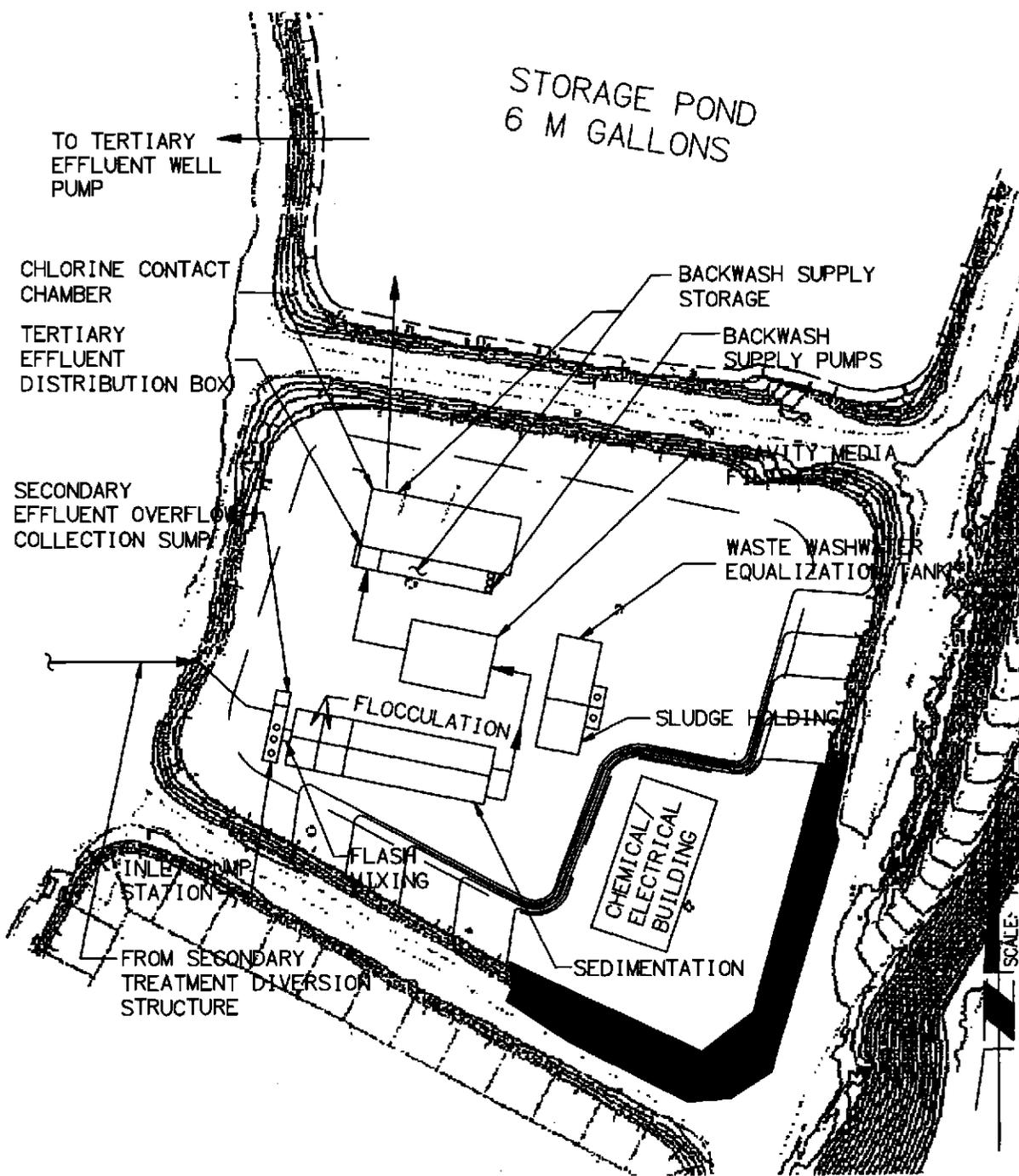
FIGURE 1-1
PROJECT LOCATION



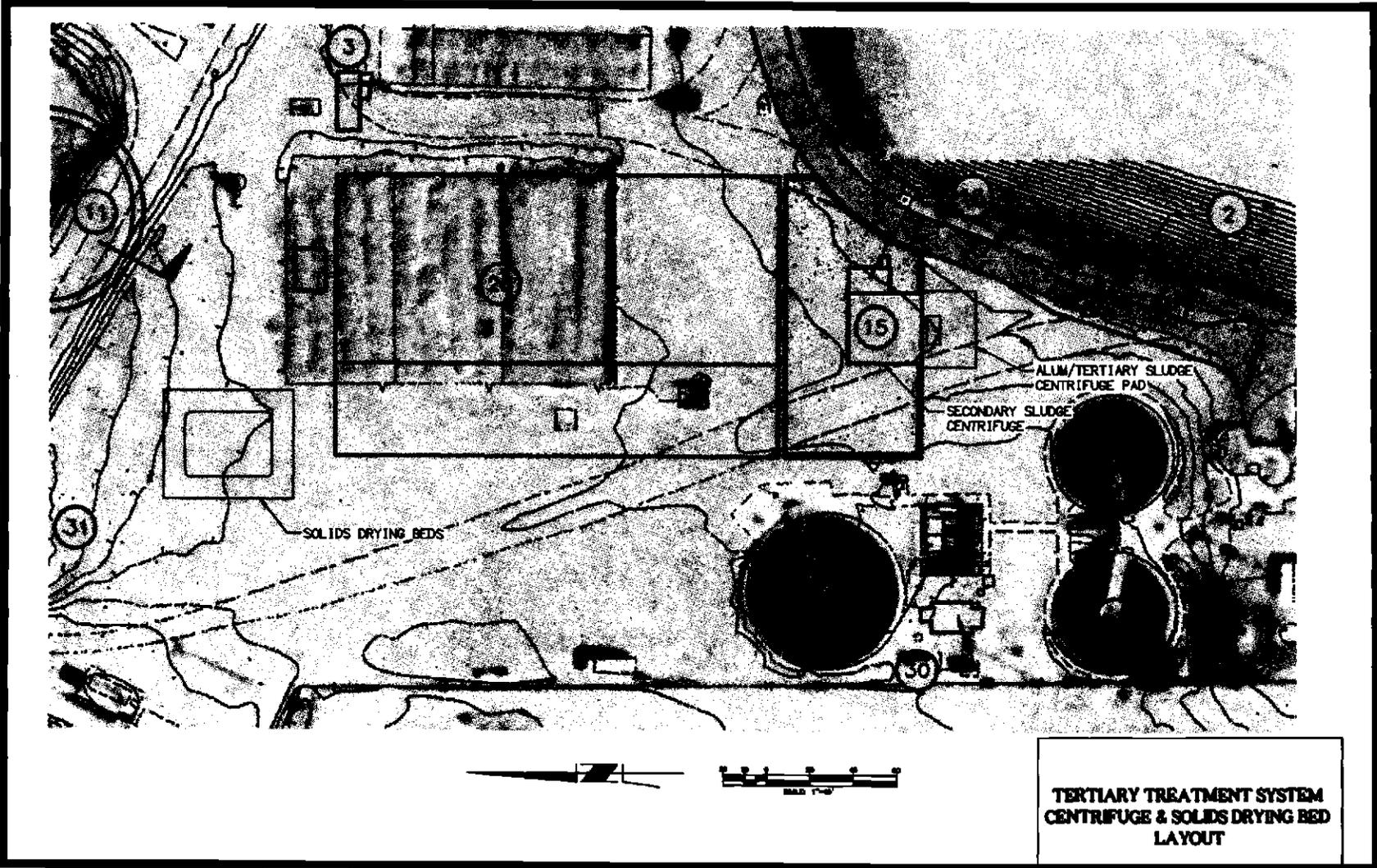
**PROCESS FLOW
SCHEMATIC FOR BRAWLEY
TERTIARY SYSTEM**



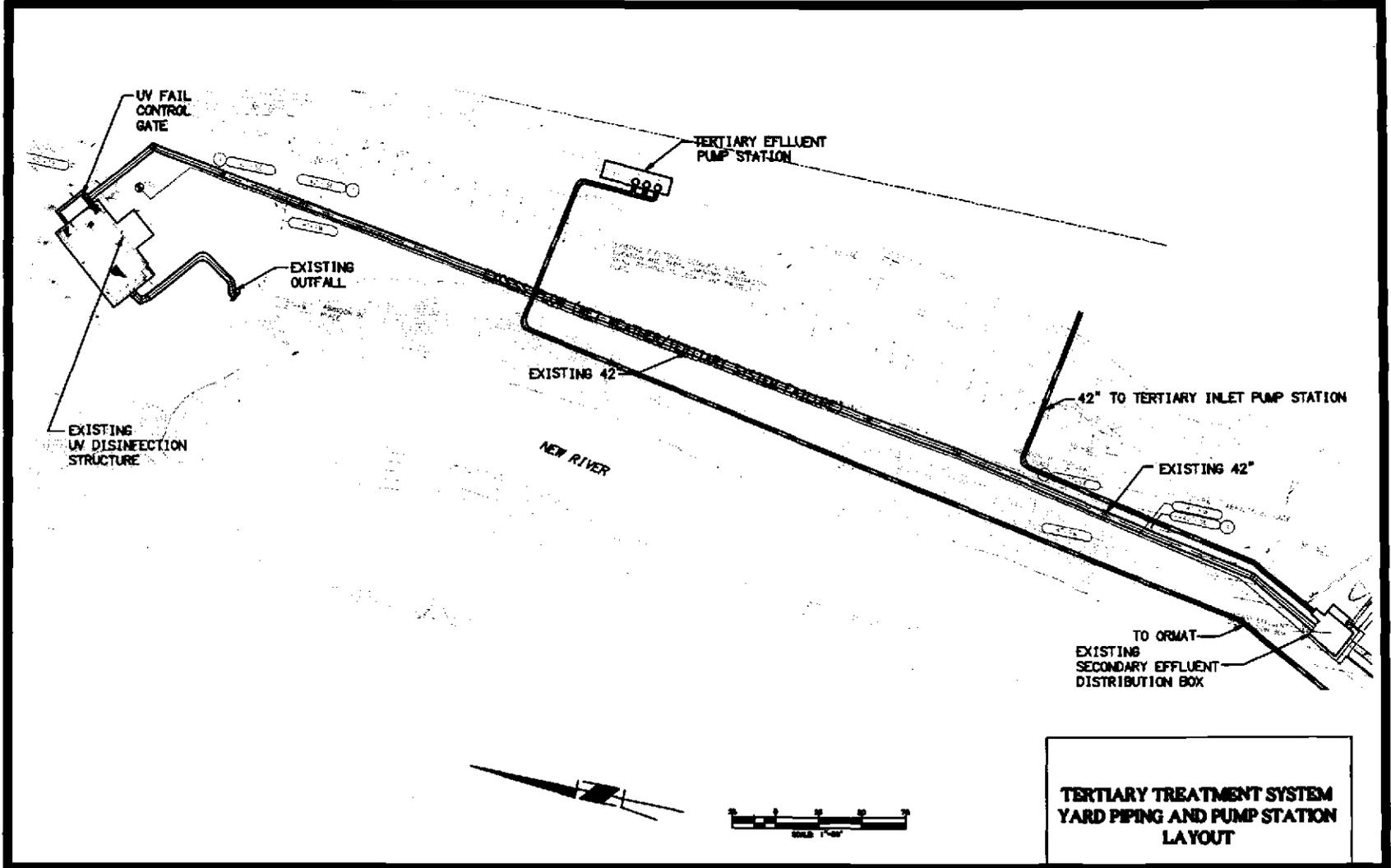
**PROCESS FLOW
WET WEATHER SCHEMATIC
FOR BRAWLEY TERTIARY**



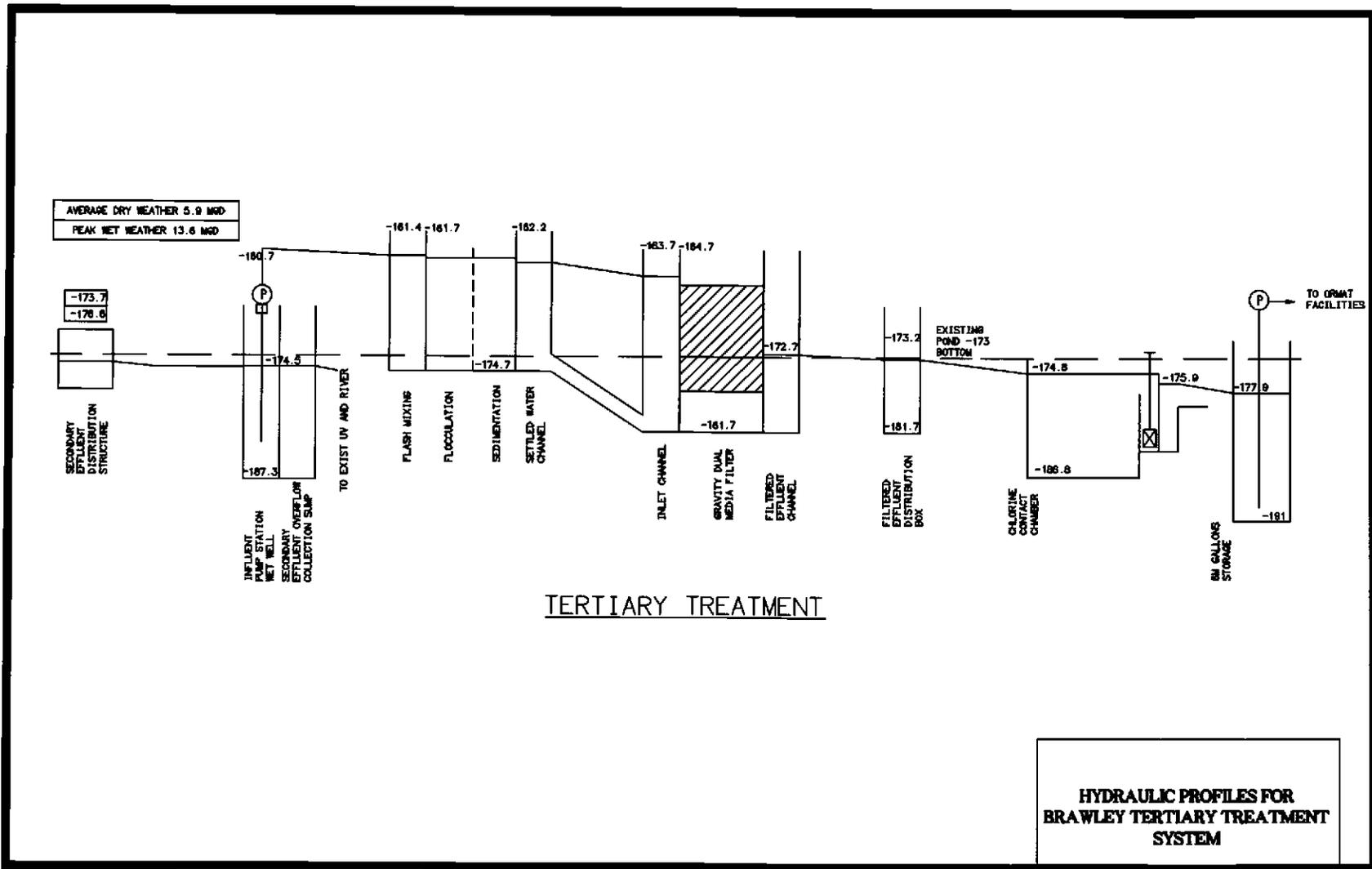
**SITE PLAN FOR BRAWLEY
TERTIARY TREATMENT
SYSTEM**



**TERTIARY TREATMENT SYSTEM
CENTRIFUGE & SOLIDS DRYING BED
LAYOUT**



**TERTIARY TREATMENT SYSTEM
 YARD PIPING AND PUMP STATION
 LAYOUT**



TERTIARY TREATMENT

HYDRAULIC PROFILES FOR
BRAWLEY TERTIARY TREATMENT
SYSTEM

CONCEPTUAL DESIGN

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The new tertiary treatment system will receive water from a secondary effluent equalization basin of a volume of approximately one million gallons. When the equalization basin is full it will overflow via weirs through the existing UV system into the river. The secondary effluent equalization basin will gravity feed the Tertiary Influent Pump Station wet well through a 42-inch pipeline. From the wet well, water would be pumped into a flash mixing chamber for alum addition. Alum or Ferric Chloride will be added using a high-energy direct-vacuum induction or pump diffusion system for near instantaneous and homogenous mixing.

Following flash mixing, the water will overflow into two (2) parallel flocculation and sedimentation trains. Flocculation will be based on a two-stage design. The first stage will provide greater mixing energy to begin particle agglomeration and floc formation. The second stage will impart less energy to avoid shearing and encourage continued growth of large settleable floc. After the flocculation chambers, water will flow into the rectangular sedimentation tanks. The majority of the suspended solids will be removed in the sedimentation basin and the supernatant will be collected via weirs from the top of the sedimentation basin. The supernatant would then flow into the multi-media filter by gravity. A polymer will be added to the water as needed to increase filter performance and minimize filtered effluent turbidity. The gravity multi-media filter would have four filtration cells operating in parallel with sand and anthracite media. The filtered water would be collected in the Filter Effluent Distribution Box.

The Filter Effluent Distribution Box will be designed with a two-way weir system that will allow the filtered water to flow into the Filter Backwash Supply Storage Sump, or to the Chlorine Contact Basin. Sodium hypochlorite will be injected at the dosage of 5 mg/L and the chlorine contact tank will provide two hours of detention time at 5.9 MGD to achieve the minimum 90 minute modal contact time required by Title 22. Once the water is disinfected by the Chlorine Contact Basin, the water would gravity flow into a storage equalization pond. The equalization pond would hold approximately 6.0 million gallons to provide an operational buffer in case of WWTP or tertiary system interruptions, or Power Plant operational disruptions. An Effluent Pump Station Wet Well would be installed in the equalization pond and supply the water to Ormat's Power Plant. If required, it would be possible to inject Sodium hypochlorite at a dosage of 2 mg/L into the effluent pump station discharge pipe in order to maintain a residual disinfectant. The free chlorine residual will be monitored and analyzed downstream of the injection point. A flow schematic for the normal operations in dry weather conditions is presented in Figure #2 – Process Flow Schematic.

If the tertiary system operations are disrupted for a brief amount of time, the secondary effluent would be diverted to the existing UV disinfection system and flow into the New River instead of the tertiary treatment process. In this short period the water demand at the East Brawley Plant would be met by utilizing the equalization storage. Any secondary effluent excess flow above 5.9 MGD would also flow to the New River through the existing UV disinfection system.

A flow schematic showing the described temporary wet weather operations is presented in Figure #3 – Wet Weather Flow.

As part of the normal dry weather tertiary operation, the Filter Effluent Distribution Box will allow the filtered effluent to flow into the Filter Backwash Supply Storage Sump. The weir height will be equivalent to the weir height that controls flow to the Chlorine Contact Basin. This would keep the Filter Backwash Supply Storage Sump full at all times. The sump would have the capacity to store water to satisfy two sequential filter backwash cycles without interrupting normal tertiary treatment system operation. The Filter Backwash Supply Pumps would convey the stored backwash supply water to the media filter at a higher rate to provide cleaning, fluidization and restratification of the media. The backwash wastewater would then be collected and conveyed back to the Influent Pump Station Wet Well.

Alum/Ferric sludge will be collected from the sedimentation basin using a chain and flight system and conveyed to a sludge holding tank. The sludge pumps will convey the collected sludge to a new centrifuge system. One new centrifuge will be installed near the existing centrifuge. A new polymer system would be utilized at the new centrifuge system to increase the dewatering efficiency. The filtrate from the centrifuge would then be recirculated to the Tertiary Influent Pump Station wet well and the solids from the centrifuge would be collected and transferred to solids drying beds for further dewatering. Once the water content of the dried solids is reduced below 50%, the solids will be hauled off to a landfill for final disposal.

Chemical storage, feed systems, and electrical distribution and control system will occupy separate areas in a common building. The chemical area will house the following chemical feed and storage systems:

- Alum
- Caustic
- Sulfuric Acid
- Sodium Hypochlorite
- Polymer (Flocculation)
- Polymer (Dewatering)
- Sodium Bisulfite

4 EFFLUENT WATER QUALITY REQUIREMENTS

The total permitted design capacity of the WWTP will be 5.9 mgd. Ormat desires to use tertiary effluent from the Brawley WWTP for the use in evaporative cooling towers. Therefore, the tertiary treatment water must meet the requirements of Title-22 disinfected tertiary recycled water. The cooling tower make-up water requirements and water quality objectives for the East Brawley Power Plant are presented in the following Tables.

Tertiary Effluent Water Quality Objective

pH	pH Unit	< 7.9	6.0 – 8.0
TDS	mg/L	< 1,200	< 1,700
Total Alkalinity	mg/L as CaCO ₃	<300	< 300
Chloride	mg/L as Cl	450	450
Sulfate	mg/L as SO ₄	300	< 600
Total Hardness	mg/L as CaCO ₃	370	< 500
Calcium Hardness	mg/L as CaCO ₃	220	< 300
Ortho-Phosphate	mg/L as PO ₄	11	1.1 – 2.6
Total Phosphate	mg/L as PO ₄	12	1.4 – 3.1
Silica	mg/L as SiO ₂	14	< 40
Total Iron	mg/L as Fe	0.25	< 0.3
Copper	mg/L as Cu	0.016	< 0.14
Aluminum	mg/L as Al	0.2	< 0.4
TSS	mg/L	< 20	< 2
Free Chlorine	mg/L as Cl ₂	0.0	0.2 – 1.0
Total Coliform	MPN/100ml	TNTC	2.2

5 CONCEPTUAL DESIGN CRITERIA

The conceptual design criteria for the Brawley Tertiary Treatment System are summarized in the following Table.

Pretreatment	
Flash Mix	HRT: 40-50 seconds Dimensions: 6' (L) x 6' (W) x 12' (D), 3' freeboard Volume: 3200 gallons Flash Mix Pump: 200 gpm Coagulant Dosage: 50-150 mg/L Alum (100% strength) pH adjustment capability: caustic and sulfuric acid
Flocculation	2 parallel trains, 2 stages each HRT at design flow, each stage: 17-18 minutes Volume each stage: 36,000 gallons Dimensions each stage: 20' (L) x 20' (W) x 12' (D), 3' freeboard Mixers: 4- 25 HP, 2-speed motors
Sedimentation	2 parallel basins Overflow Rate: 1 gpm/sf Volume each stage: 180,000 gallons Dimensions: each 100' (L) x 20' (W) x 12' (D), 3' freeboard Effluent Weir Loading: 20,000 gpd/ ft; 150 LF each basin Chain and flight sludge collection
Chemical Feed and Storage Facilities	Alum Storage: 1 x 15,000 gal tank Polymer Storage: 2 x 55 gal tanks Caustic Storage: 1 x 2,000 gal tank Sulfuric Acid Storage: 1 x 100 gallon tank Chlorine (Sodium Hypochlorite) Storage: 2x 3,000 gal tanks Alum Dosing Equip: 1 gpm Building Dimensions (Portion of Combined Chem/Elect Bldg): 50' (W) x 80' (L)
Filtration	
Gravity Multi-Media Filtration System	No. of Filters: 4 Filtration Rate: 4 gpm/ft ² w/1 unit offline Dimensions(each): 18.5' (L) x 18.5' (W) x 17' (H) Max BW rate: 5200 gpm
Backwash Waste Stream	Max. Daily volume: 160,000 gallons Equalization Volume: 120,000 gallons
Backwash Waste Return Capacity	200 gpm
Pumping	
Tertiary Inlet Pump Station	3 vertical centrifuge 480V motors 2 duty with VFD +1 standby (without VFD) Design Flow: 2,100 gpm each
Backwash Supply Pumps	3 vertical centrifuge 480V motors 2 duty with VFD +1 standby (without VFD) Design Flow: 2,500 gpm each
Tertiary Effluent Pump Station	3 vertical centrifuge 480V motors 2 duty with VFD +1 standby (without VFD) Design Flow: 2,100 gpm each

6 PROJECT LAYOUT

The proposed site layout for the preferred project is shown in the Figure #4 – Site Plan Layout. The major treatment equipment would be located in Pond S2 (second pond from the north). The new tertiary system centrifuge would be located adjacent to the existing centrifuge for the secondary sludge. The 6.0 MG equalization pond would be located within the existing Pond S3 (the most northern pond) and the tertiary effluent pump station would be located on the north side of this pond. An access road has been designed around the tertiary treatment plant for ease of access and maintenance. The electrical equipment and chemical feed system would be located in the southwest corner of Pond S2. Both the electrical equipment and the chemical feed system would be in an air conditioned building.

The preliminary hydraulic profile of the conceptual design is shown in Figure #5 – Hydraulic Profiles.

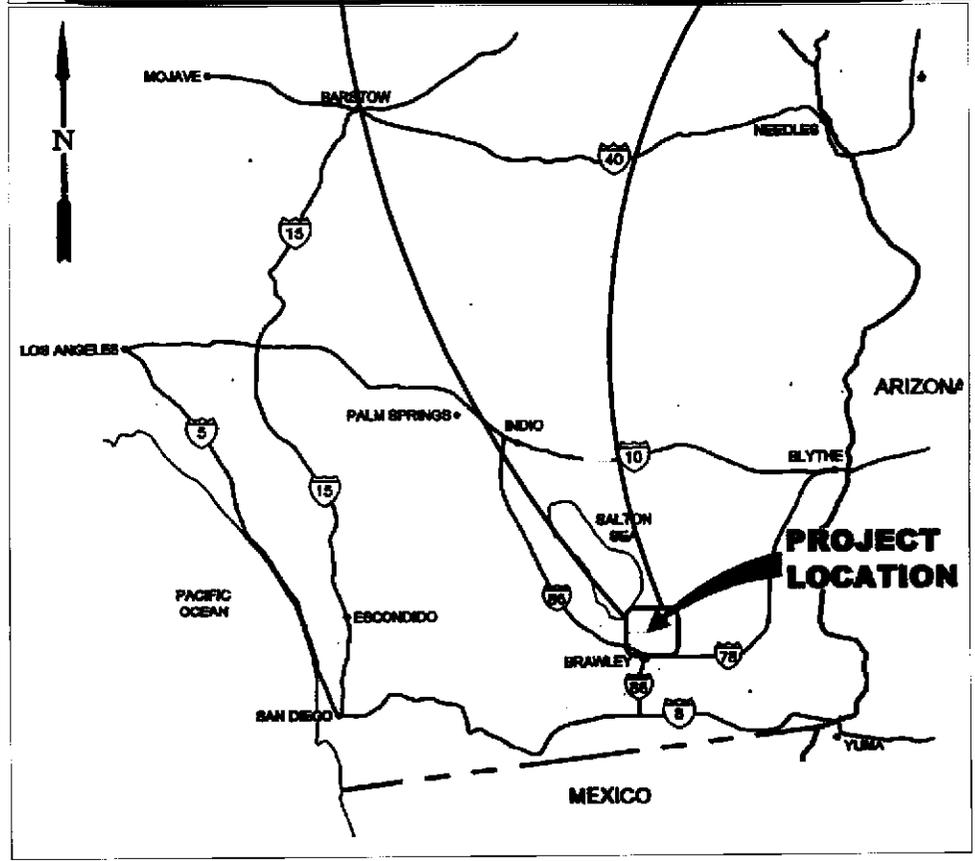
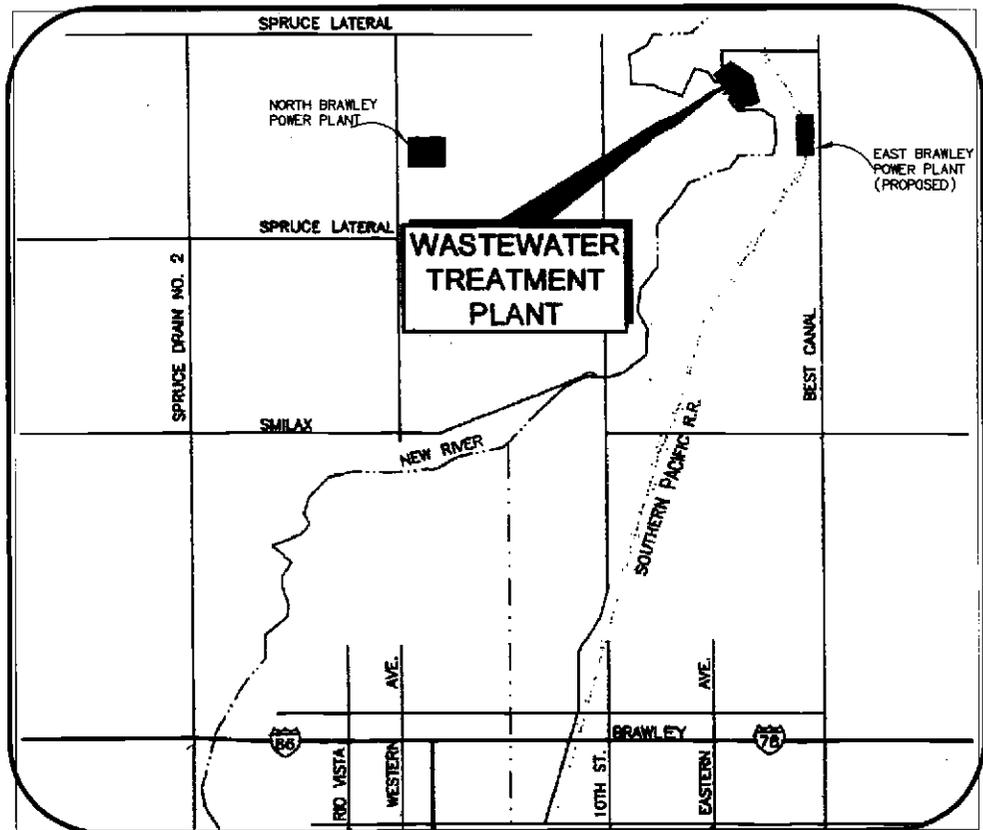
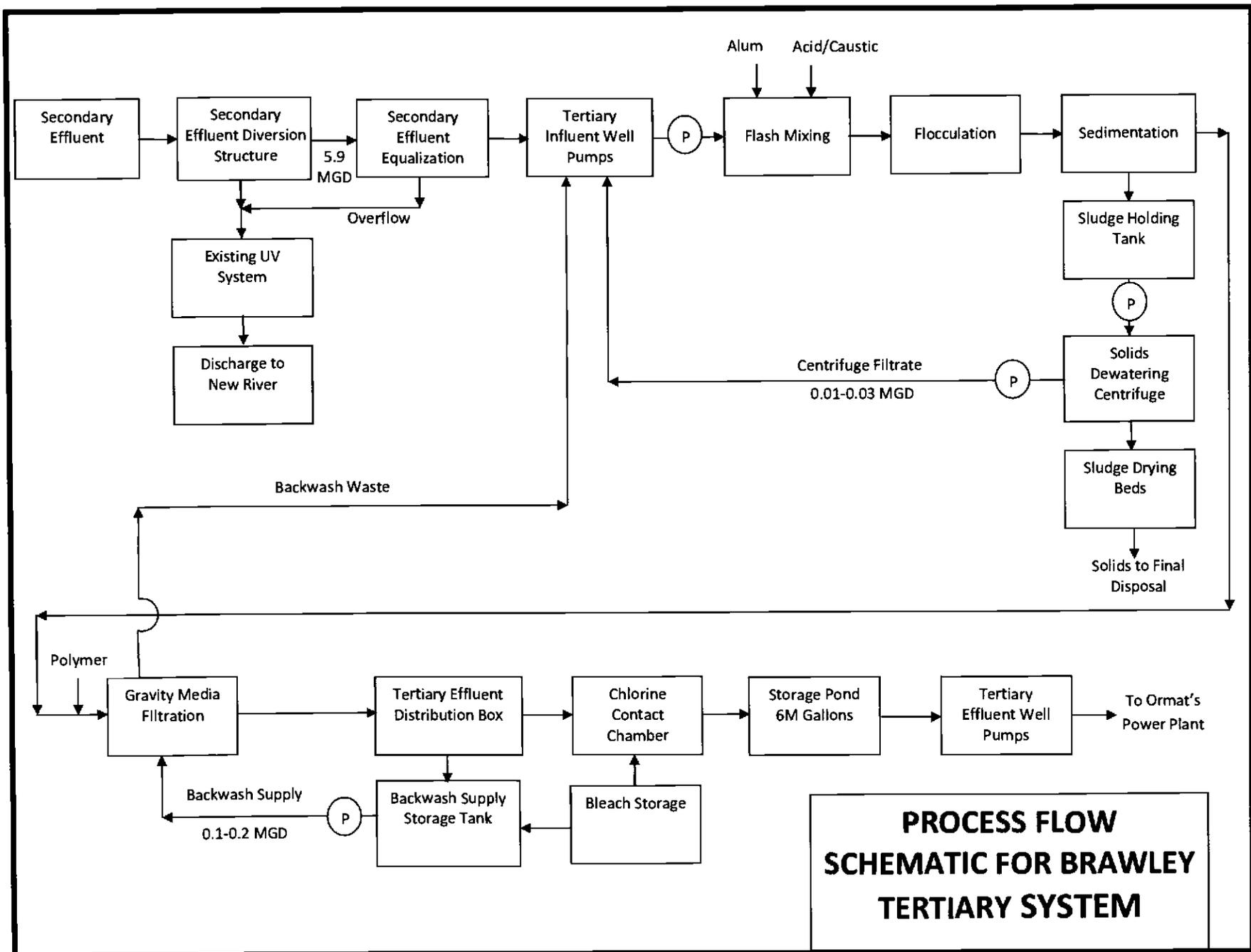
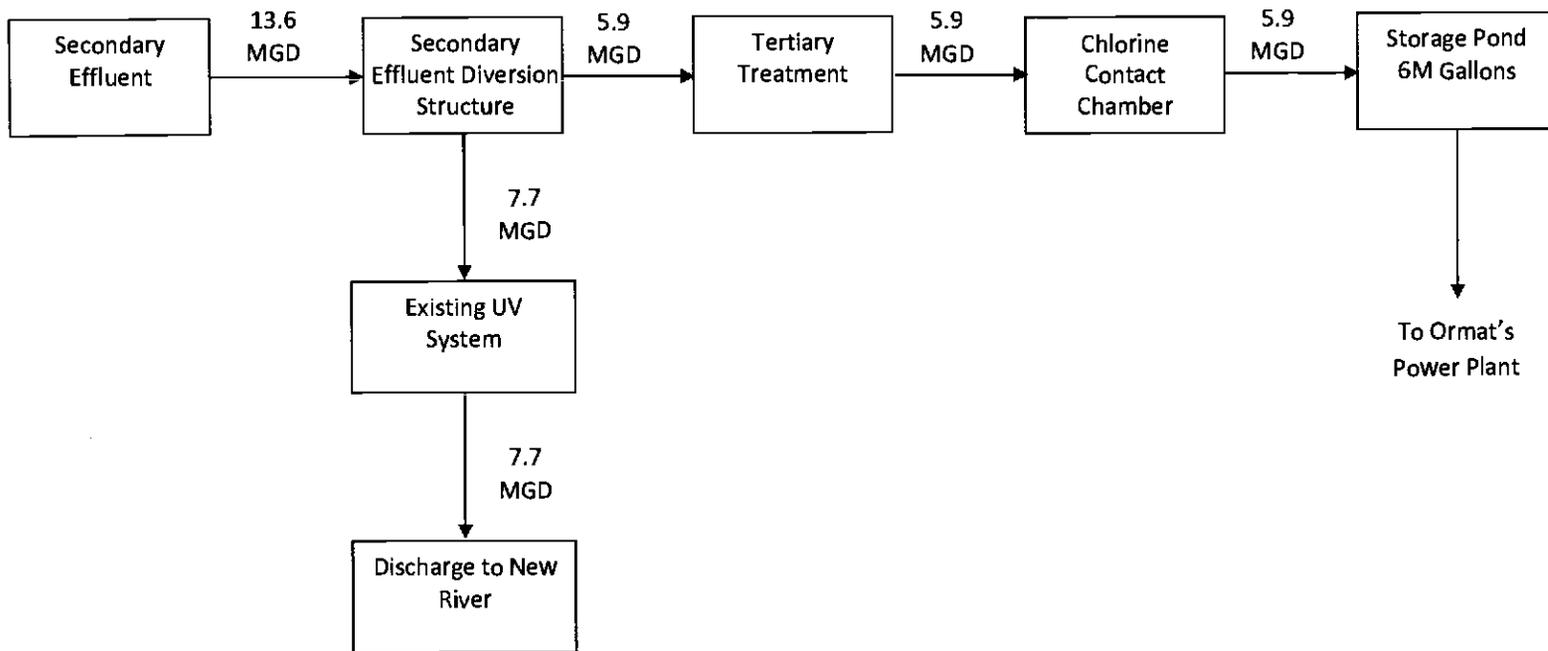


FIGURE 1-1
PROJECT LOCATION



**PROCESS FLOW
SCHEMATIC FOR BRAWLEY
TERTIARY SYSTEM**



**PROCESS FLOW
WET WEATHER SCHEMATIC
FOR BRAWLEY TERTIARY**

- 1 LV STRUCTURE
- 2 SECONDARY EFFLUENT DISTRIBUTION BOX
- 3 AERATION BASIN NO 4 (FUTURE)
- 4 AERATION BASIN NO 3
- 5 INFLUENT STORM FLOW EQUALIZATION BASIN
- 6 SECONDARY CLARIFIER NO 3
- 7 SECONDARY CLARIFIER NO 4 (FUTURE)
- 8 COVERED DRINKING BED
- 9 UNCOVERED DRINKING BED
- 10 CENTRIFUGE
- 11 POLYMER FACILITY

PLAN
SCALE: 1"=40'

BRAWLEY WASTEWATER TREATMENT PLANT
TERTIARY TREATMENT SYSTEM FOR
MUNICIPAL WASTEWATER

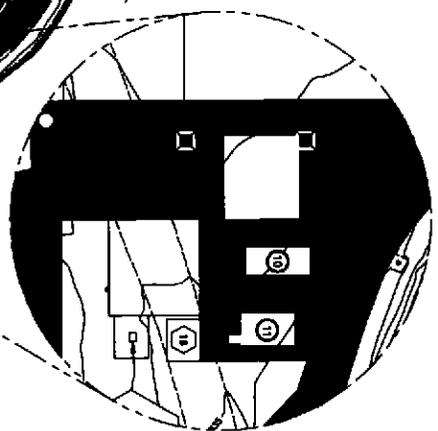
SITE PLAN
ALTERNATIVE 1A



- 1 EQUALIZATION BASIN (1 MILLION GALLONS)
- 2 FLASH MIXING
- 3 FLOCCULATION BASINS
- 4 SEDIMENTATION BASINS
- 5 GRANITE MEDIA FILTERS
- 6 CHLORINE CONTACT TANK
- 7 BACKWASH SUPPLY STORAGE
- 8 TERTIARY EFFLUENT DISTRIBUTION BOX
- 9 WASTE WASTEWATER EQUALIZATION TANK
- 10 SALINE HOLDING
- 11 CENTRALIZED PUMP STATION
- 12 ELECTRICAL BUILDING
- 13
- 14

- 14 TERTIARY STORAGE POND (6 MILLION GALLONS)
- 15 TERTIARY CENTRIFUGE
- 16 POLYMER FACILITY

ENLARGED PLAN
SCALE: 1"=20'



AVERAGE DRY WEATHER 5.9 MGD
 PEAK WET WEATHER 13.6 MGD

826.3
 827.4

SECONDARY EFFLUENT DISTRIBUTION STRUCTURE

825.5
 EQUALIZATION BASIN 1M GALLONS

839.3
 825.5
 INFLUENT PUMP STATION WET WELL

838.6 838.3
 FLASH MIXING
 FLOCCULATION

837.8
 SEDIMENTATION
 SETTLED WATER CHANNEL

836.3 835.3
 818.3
 INLET CHANNEL
 GRAVITY DUAL MEDIA FILTER
 FILTERED EFFLUENT CHANNEL

826.8
 818.3
 FILTERED EFFLUENT DISTRIBUTION BOX

EXISTING POND 827 BOTTOM

825.2
 813.2
 CHLORINE CONTACT CHAMBER

824.1
 822.1
 809
 6M GALLONS STORAGE
 TO ORMAT FACILITIES

TERTIARY TREATMENT

HYDRAULIC PROFILES FOR
 BRAWLEY TERTIARY TREATMENT
 SYSTEM

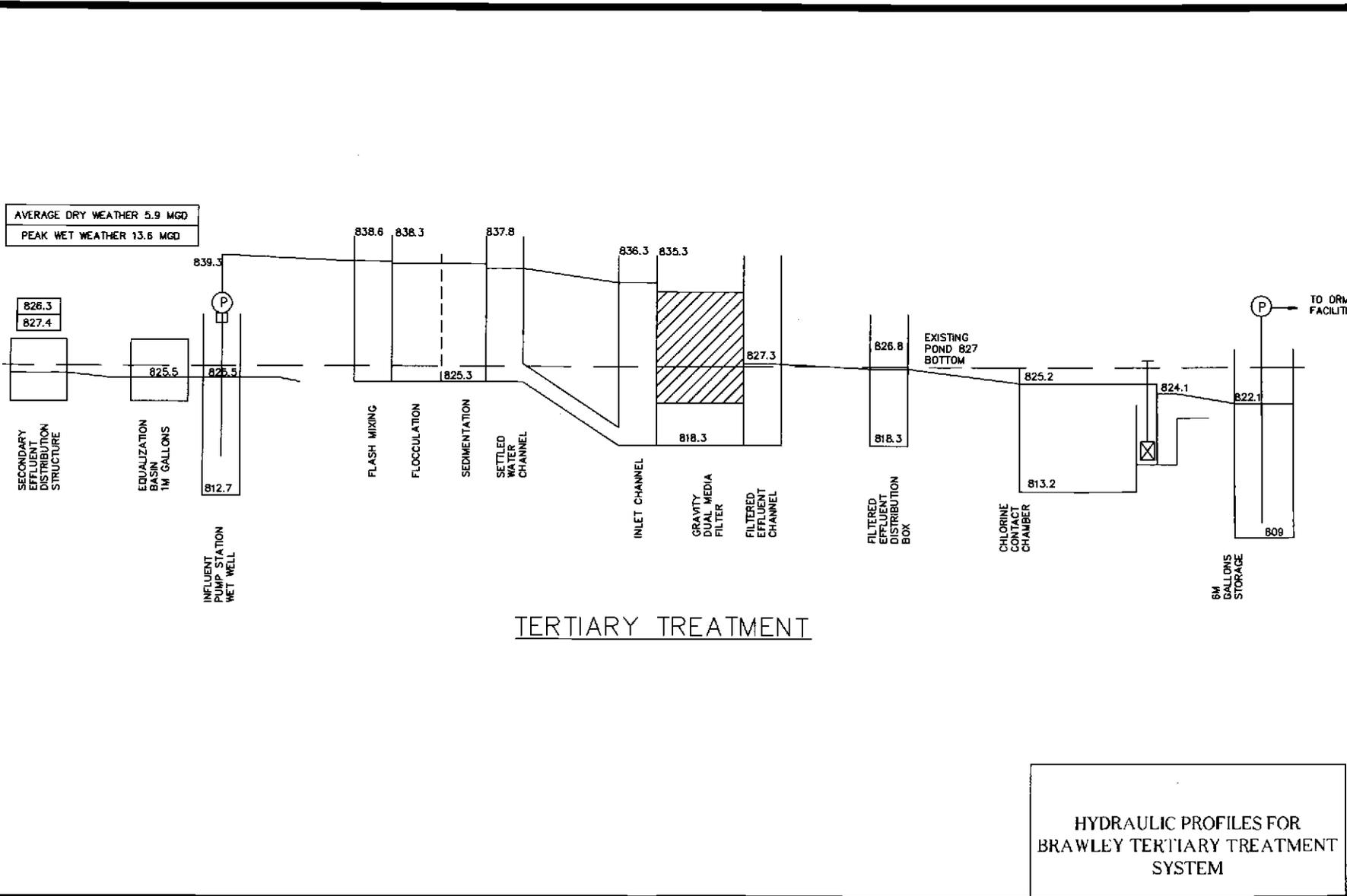


EXHIBIT 23

Exhibit Omitted

EXHIBIT 24



**COMMENTS ON
BRAWLEY WWTP
TERTIARY TREATMENT FACILITY
CONCEPTUAL DESIGN REPORT**

1. Project Description

1. Current average plant flow is 3.9 mgd. Peak daily flow is approximately 5.1 mgd. At plant design flow, the average daily flow will be 5.9 mgd, with a daily peak of 7.7 mgd. Due to the diurnal variation in flow, secondary effluent flow equalization is recommended to maximize capture of effluent and minimize cycling of the UV system for river discharge. A flow equalization basin of approximately 1 million gallons is recommended. The secondary effluent discharge structure has been designed to feed such a basin. Flow is diverted to the equalization basin until it is full, after which flow discharges over weirs and is directed to the river. This is the only diversion to the river which is necessary. During storm peaks or interruptions in tertiary treatment, the equalization basin will fill and then overflow to the river through the UV structure.
2. The proposed Secondary Effluent Overflow Sump is not required, since the secondary effluent diversion structure will direct excess flow to the river.
3. Centrate from the centrifuge for tertiary treatment sludge dewatering may be directed to the treatment plant head works, secondary effluent line or diverted to the storm water equalization basin in the event of process upset. Diversion to the secondary effluent line would save substantial piping, assuming secondary effluent equalization is constructed.
4. Existing drying beds located next to the new operations building may be used for further drying of dewatered tertiary sludge. The location shown for new drying beds is in a storm water detention basin and is not recommended.

2. Plant Layout

1. The proposed plant layout unnecessarily wastes space on the plant site. The current plant design can easily be expanded to 9 mgd with the addition of one additional aeration basin (shown in S-1 basin) and one final clarifier, and has been designed for that ultimate expansion. Further expansion of the plant will require the construction of a new secondary facility which can share the headworks of the existing plant. That future facility would be located on the northern portion of the plant site. The proposed tertiary layout consumes the S-2 basin for tertiary treatment and the S-3 basin for storage. In contrast, two alternate layouts have been provided, each of which provide for 1 million gallons of secondary effluent equalization in addition to 6 million gallons of tertiary effluent storage. Alternative 1A provides for construction of the tertiary facility in one half of the S-2 basin, with the other half used for tertiary effluent storage. Alternative 1B provides for construction of tertiary facilities in the unused portion of the S-1 basin, with secondary effluent storage in the S-2 basin. Expansion of the tertiary

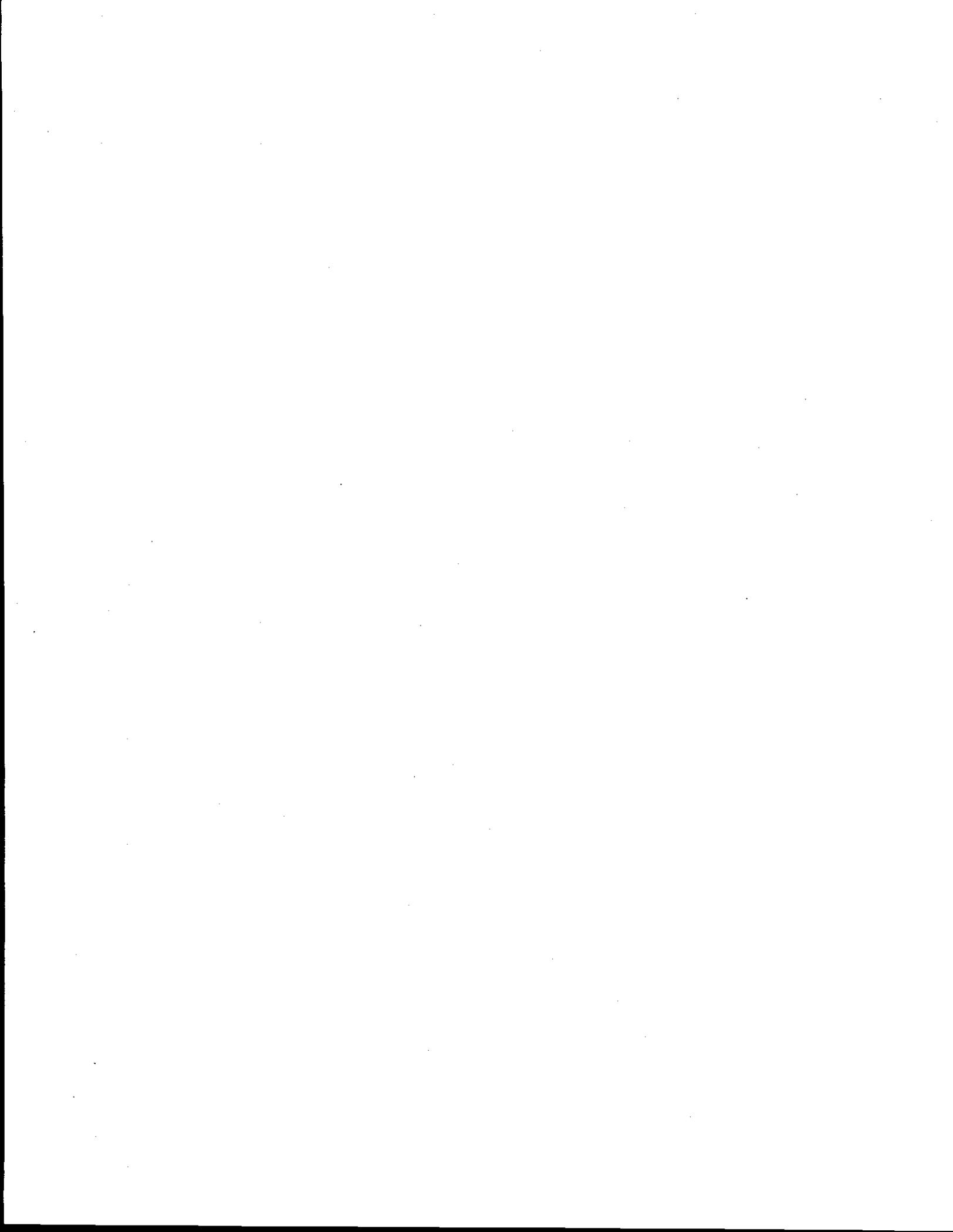
facilities in the future can be accommodated in Alternative 1B by expanding to the north, with partial fill of the S-2 basin.

2. Construction may be accelerated and costs reduced by not building in the S-3 basin. Significant sludge quantities are in all three "S" basins. Sludge from the S-1 and S-2 basins may be pumped into the S-3 basin, leaving little sludge in the first two basins to dry and remove. The sludge relocated to the S-3 basin may be allowed to dry over an extended period of time, dramatically reducing disposal costs.
3. The elevations of the "basin bottoms" were taken from aerial survey which was conducted while the basins were full. The actual basin bottom is 10 feet below the elevation shown on the topo map. The hydraulic profile incorrectly shows the basin elevations. The actual basin bottom is at -183 (by convention, to avoid confusion from negative elevations, 1000 ft is generally added to all elevations, so that on the Contract drawings, the elevation of the basin bottoms would be shown as El. 817. Note that the groundwater elevation on the site varies from El. 818 to 828. It may be beneficial to raise the structure elevations to avoid issues with highly corrosive groundwater.
4. The yard piping and pump station layout shows a tertiary effluent line running along the outside of the western embankment along the river going to Ormat. The embankment provides protection from a 100 year flood, and requires regular maintenance to repair erosion damage. Construction along the embankment is not recommended above ground as it may interfere with embankment maintenance, and construction along the top of the berm will be quite difficult because of numerous existing and proposed pipelines in the embankment along with several electrical duct banks. Assuming that the Ormat facility is located to the east of the southern end of the plant, a route along the top of the embankment east of the plant would be recommended to avoid interferences with other plant lines.
5. The yard piping and pump station layout also shows a UV fail control gate mounted at the existing UV structure. Please note that the requirements for disinfection for river discharge are much less stringent than for Title 22 use. However, the gate could be used to control the UV operation. The gate would be normally closed. High level at the gate would serve to activate the UV disinfection system. When the system was operational, the gate would open, allowing discharge through the UV system to the river. When flow ceased, the gate would be reclosed.

3. Assumed Biolac® Effluent Process Performance

1. NPDES monthly and quarterly data for the WWTP effluent were analyzed and compared with assumed effluent water quality. This data is being updated with more recent data, so numbers will not be presented here, but will be made available as soon as all available data have been analyzed. The following areas may exceed the assumed effluent concentrations: TDS (may be approx. 1400 mg/l on average, with 1600 mg/l monthly peak), sulfate, total hardness, calcium hardness and total phosphate.

EXHIBIT 25





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April 21, 2011

Janet Laurain
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080

Re: Public Records Request – East Brawley Geothermal Power Plant Project

Dear Ms. Laurain:

Enclosed, please find all non-exempt, non-privileged documents responsive to the above-referenced request dated March 30, 2011.

Other documents which may be responsive to your request were withheld for various reasons:

- The documents are exempt from production under the CPRA, as they contain information protected by the deliberative process privilege. See Govt. Code Sec. 6255; Times Mirror Co. v. Superior Court (1991) 53 Cal.3d 1325; and Rogers v. Superior Court (1993) 19 Cal. App. 4th 469.
- The documents are preliminary drafts, notes, inter-agency and intra-agency memoranda that are not retained by the District in the ordinary course of business. Gov. Code 6254(a); 6255.
- The documents are exempt pursuant to Gov. Code Section 6255.
- The documents are protected from disclosure based on the attorney client and/or the attorney work-product privilege.

Please remit to this office payment to IID in the amount of \$35.00 for copying expenses.

Sincerely,


Vance M. Taylor
Assistant Counsel

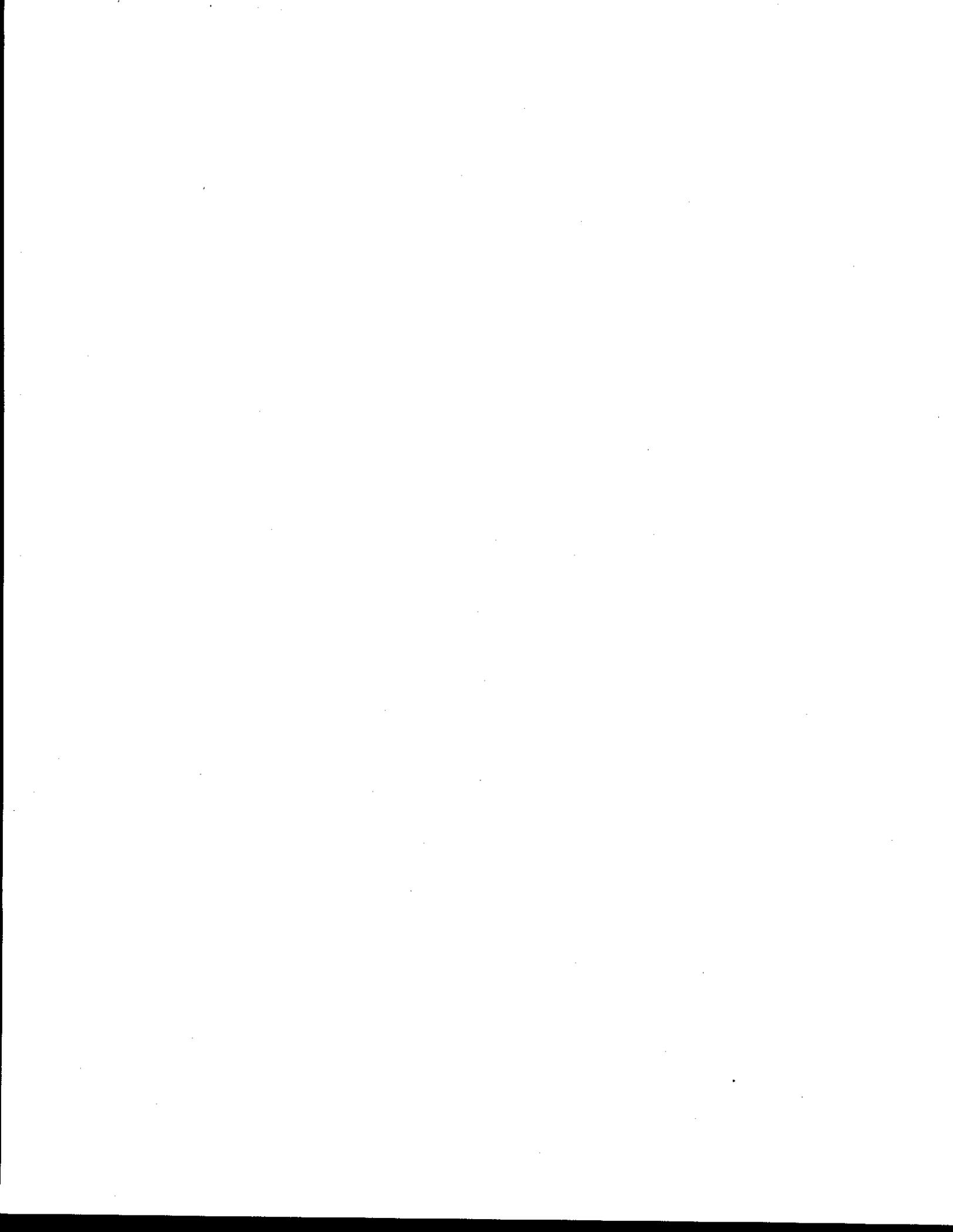
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RECEIVED

APR 27 2011

ADAMS BROADWELL JOSEPH & CARDOZO

EXHIBIT 26



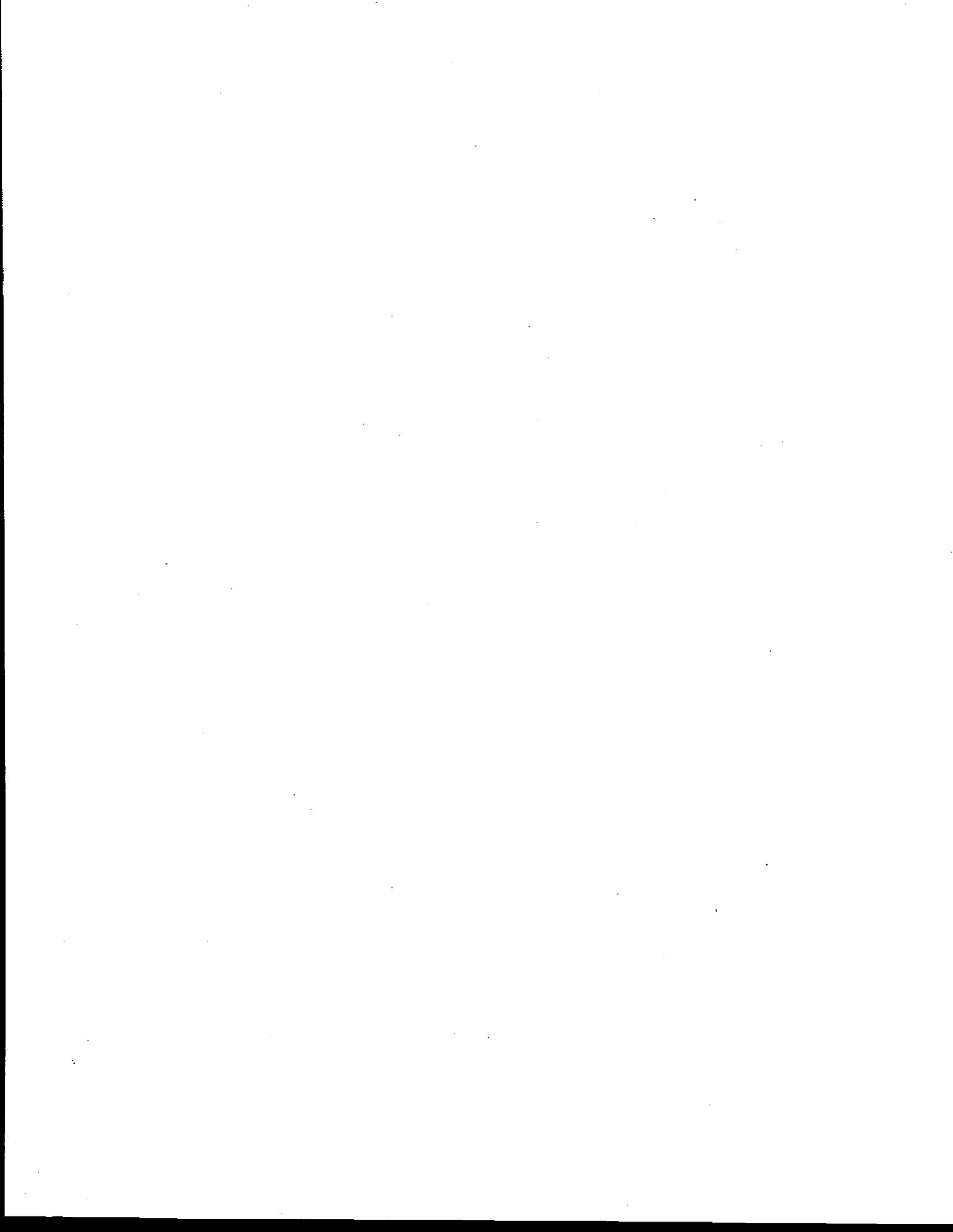
FACILITY STUDY AGREEMENT

BETWEEN

IMPERIAL IRRIGATION DISTRICT

AND

ORMAT NEVADA INC.
NORTH BRAWLEY GEOTHERMAL PROJECT



**Interconnection Facilities Study Agreement
between
Imperial Irrigation District and Ormat Nevada Inc.**

THIS AGREEMENT is made and entered into this ___ day December, 2007 by and between Ormat Nevada Inc., a California corporation organized and existing under the laws of the State of California, ("Interconnection Customer,") and Imperial Irrigation District an irrigation district organized under the Water Code of the State of California, ("Transmission Provider "). Interconnection Customer and Transmission Provider each may be referred to as a "Party," or collectively as the "Parties."

RECITALS

WHEREAS, Interconnection Customer is proposing to develop a Generating Facility or generating capacity addition to an existing Generating Facility consistent with the Interconnection Request submitted by Interconnection Customer dated December 13, 2007; and

WHEREAS, Interconnection Customer desires to interconnect the Generating Facility with the Transmission System;

WHEREAS, Transmission Provider has completed an Interconnection System Impact Study (the "System Impact Study") and provided the results of said study to Interconnection Customer; and

WHEREAS, Interconnection Customer has requested Transmission Provider to perform an Interconnection Facilities Study to specify and estimate the cost of the equipment, engineering, procurement and construction work needed to implement the conclusions of the Interconnection System Impact Study in accordance with Good Utility Practice to physically and electrically connect the Generating Facility to the Transmission System.

NOW, THEREFORE, in consideration of and subject to the mutual covenants contained herein the Parties agree to the following:

- 1.0 When used in this Agreement, with initial capitalization, the terms specified shall have the meanings indicated in Transmission Provider's Generator Interconnection Procedure (GIP).
- 2.0 Interconnection Customer elects and Transmission Provider shall cause an Interconnection Facilities Study consistent with Section 8.0 of this GIP to be performed in accordance with the Tariff.
- 3.0 The scope of the Interconnection Facilities Study shall be subject to the assumptions set forth in Attachment A and the data provided in Attachment B to this Agreement.

4.0 The Interconnection Facilities Study report (i) shall provide a description of estimated cost of (consistent with Attachment A), and schedule for the required facilities to interconnect the Generating Facility to the Transmission System and (ii) shall address any short circuit, instability, thermal overload or voltage limitations, and power flow issues identified in the Interconnection System Impact Study.

5.0 Interconnection Customer shall provide a deposit of \$100,000 for the performance of the Interconnection Facilities Study. The time for completion of the Interconnection Facilities Study is specified in Attachment A.

Transmission Provider shall invoice Interconnection Customer on a monthly basis for the work to be conducted on the Interconnection Facilities Study each month. Interconnection Customer shall pay invoiced amounts within thirty (30) Calendar Days of receipt of invoice. Transmission Provider shall continue to hold the amounts on deposit until settlement of the final invoice.

6.0 Miscellaneous. The Interconnection Facilities Study Agreement shall include standard miscellaneous terms including, by reference, the Indemnity and Consequential Damages provisions in Article 18 of the Generator Interconnection Agreement (GIA), and including, but not limited to, representations, disclaimers, warranties, governing law, amendment, execution, waiver, enforceability and assignment, that reflect best practices in the electric industry, and that are consistent with regional practices, applicable laws and regulations, and the organizational nature of each Party. All of these provisions, to the extent practicable, shall be consistent with the provisions of the GIP and the GIA.

7.0 Equipment Release Disclaimer. Transmission Provider's Interconnection Facilities Study shall not be construed as confirming or endorsing the design, or as warranty of safety, durability, reliability or suitability of Interconnection Customer's Generating Facility or installation thereof for any use, including the use intended by Interconnection Customer.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be duly executed by their duly authorized officers or agents on the day and year first above written.

Imperial Irrigation District

By: 

Name: David L. Barajas

Title: Gen. Supt. Transmission Planning and Contracts

Date: 1/4/08

Ormat Nevada, Inc.

By: 

Name: Dallas Peavey

Title: Authorized Representative

Date: 12/11/07

ATTACHMENT A
Interconnection Facilities Study Agreement

**INTERCONNECTION CUSTOMER SCHEDULE ELECTION FOR
CONDUCTING THE INTERCONNECTION FACILITIES STUDY**

Transmission Provider shall use Reasonable Efforts to complete the study and issue a draft Interconnection Facilities Study report to Interconnection Customer within the following number of days after of receipt of an executed copy of this Interconnection Facilities Study Agreement:

- ninety (90) Calendar Days with no more than a +/- 20 percent cost estimate contained in the report.

ATTACHMENT B
Interconnection Facilities Study Agreement

DATA FORM TO BE PROVIDED BY INTERCONNECTION CUSTOMER
WITH
THE INTERCONNECTION FACILITIES STUDY AGREEMENT

Provide location plan and simplified one-line diagram of the plant and station facilities. For staged projects, please indicate future generation, transmission circuits, etc.

One set of metering is required for each generation connection to the new ring bus or existing Transmission Provider station. Number of generation connections: 1

On the one line diagram indicate the generation capacity attached at each metering location. (Maximum load on CT/PT): *Maximum gross generation capacity is 75 Mw for phase A and 75 Mw for phase B. Maximum output at interconnect is 49.9 Mw for phase A and 49.9 Mw for Phase B.*

On the one line diagram indicate the location of auxiliary power. (Minimum load on CT/PT) Amps. *The minimum load will be 300 kw (2 amp at 92Kv) for phase A and 300 kw for phase B.*

Will an alternate source of auxiliary power be available during CT/PT maintenance?

Yes No

Will a transfer bus on the generation side of the metering require that each meter set be designed for the total plant generation?

Yes No (Please indicate on one line diagram).

What type of control system or PLC will be located at Interconnection Customer's Generating Facility?

Allen Bradley SLC_500 / Control Logic

What protocol does the control system or PLC use?

TCP/IP _____

Please provide a 7.5-minute quadrangle of the site. Sketch the plant, station, transmission line, and property line.

Physical dimensions of the proposed interconnection station:

200 feet by 250 feet _____

Bus length from generation to interconnection station:

250 feet _____

Line length from interconnection station to Transmission Provider's transmission line.

PHASE-A

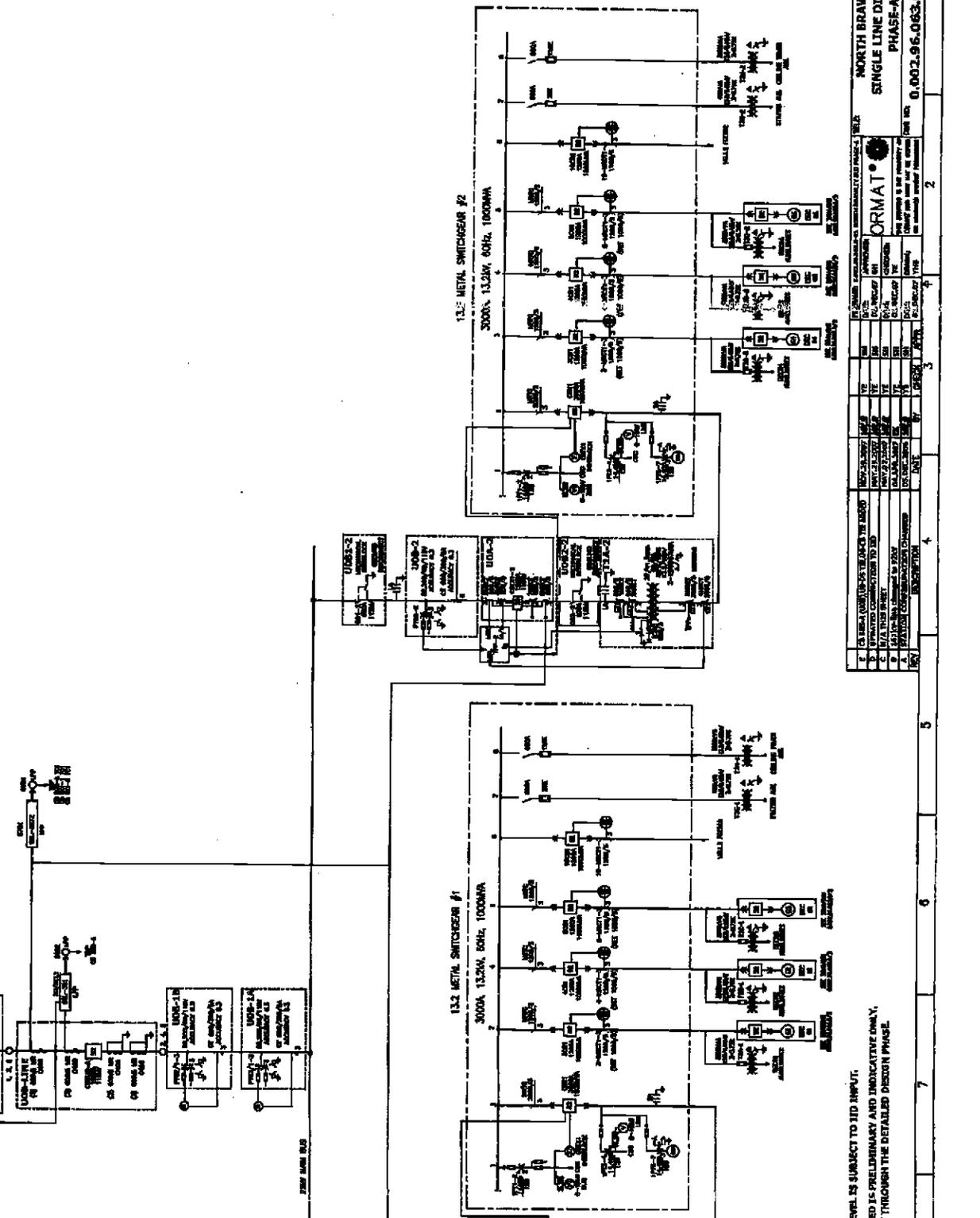
ORMAT

TO RD DEPT. LINE

UP-CB TIE

UP-DS TIE

FUTURE CONNECTION TO PHASE B
(DWS, 7.00Z.96.063.0 SHEET 2 OF 3)



- NOTES:
1. PHASE-HIGH VOLTAGE LEVEL IS SUBJECT TO IED INPUT.
 2. THE ARRANGEMENT PRESENTED IS PRELIMINARY AND INDICATIVE ONLY. CONTRACTOR MAY REVISE IT THROUGH THE DETAILED DESIGN PHASE.

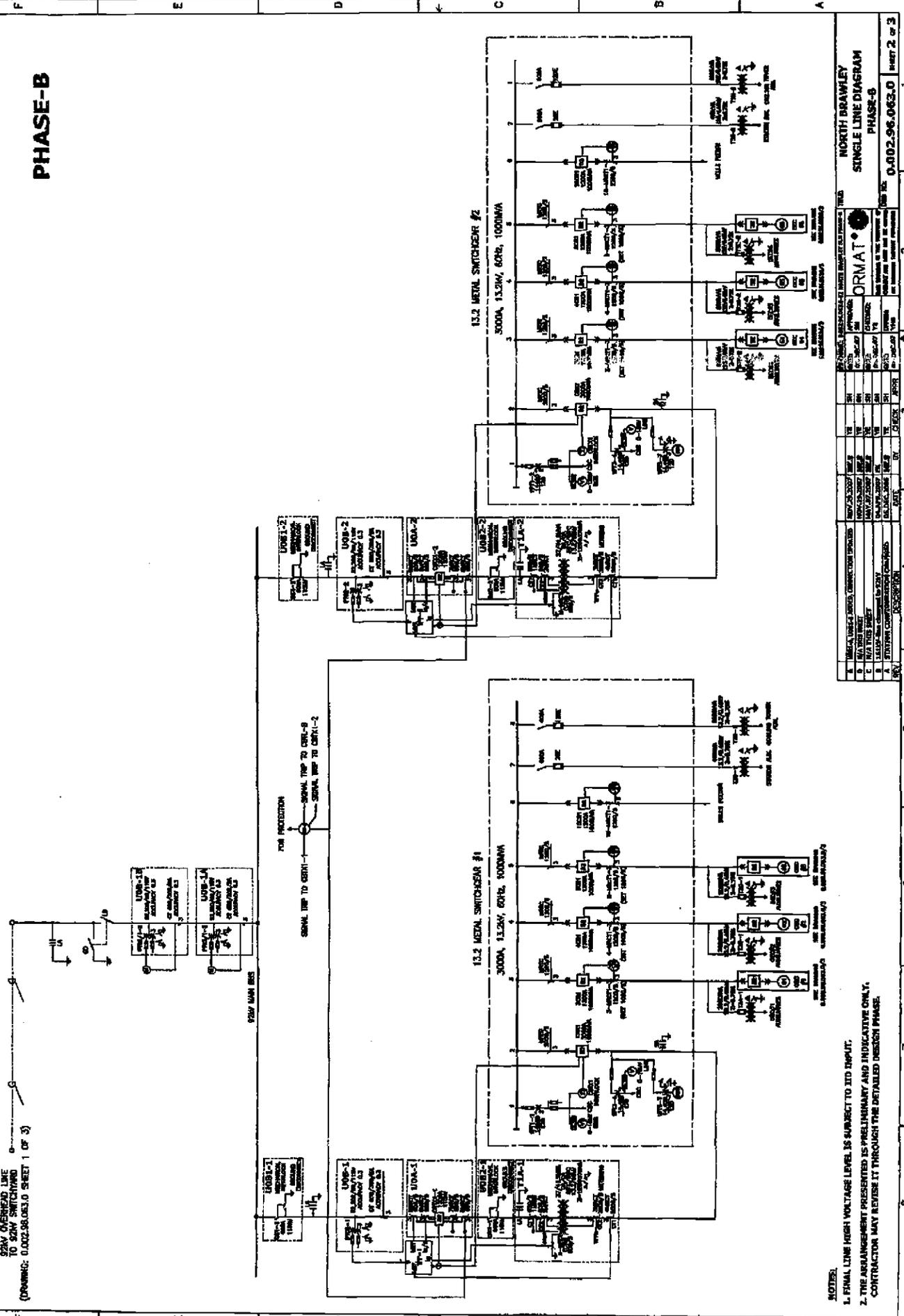
REVISIONS		DATE		BY		CHECKED		APPROVED	
1	ISSUED FOR CONSTRUCTION	07/25/2007	07/25/2007	MM	MM	MM	MM	MM	MM
2	ISSUED FOR CONSTRUCTION	07/25/2007	07/25/2007	MM	MM	MM	MM	MM	MM
3	ISSUED FOR CONSTRUCTION	07/25/2007	07/25/2007	MM	MM	MM	MM	MM	MM
4	ISSUED FOR CONSTRUCTION	07/25/2007	07/25/2007	MM	MM	MM	MM	MM	MM
5	ISSUED FOR CONSTRUCTION	07/25/2007	07/25/2007	MM	MM	MM	MM	MM	MM

REVISIONS		DATE		BY		CHECKED		APPROVED	
1	ISSUED FOR CONSTRUCTION	07/25/2007	07/25/2007	MM	MM	MM	MM	MM	MM
2	ISSUED FOR CONSTRUCTION	07/25/2007	07/25/2007	MM	MM	MM	MM	MM	MM
3	ISSUED FOR CONSTRUCTION	07/25/2007	07/25/2007	MM	MM	MM	MM	MM	MM
4	ISSUED FOR CONSTRUCTION	07/25/2007	07/25/2007	MM	MM	MM	MM	MM	MM
5	ISSUED FOR CONSTRUCTION	07/25/2007	07/25/2007	MM	MM	MM	MM	MM	MM

ORMAT
 NORTH BRAWLEY
 SINGLE LINE DIAGRAM
 PHASE-A
 0.002.96.063.0 SHEET 1 OF 3

PHASE-B

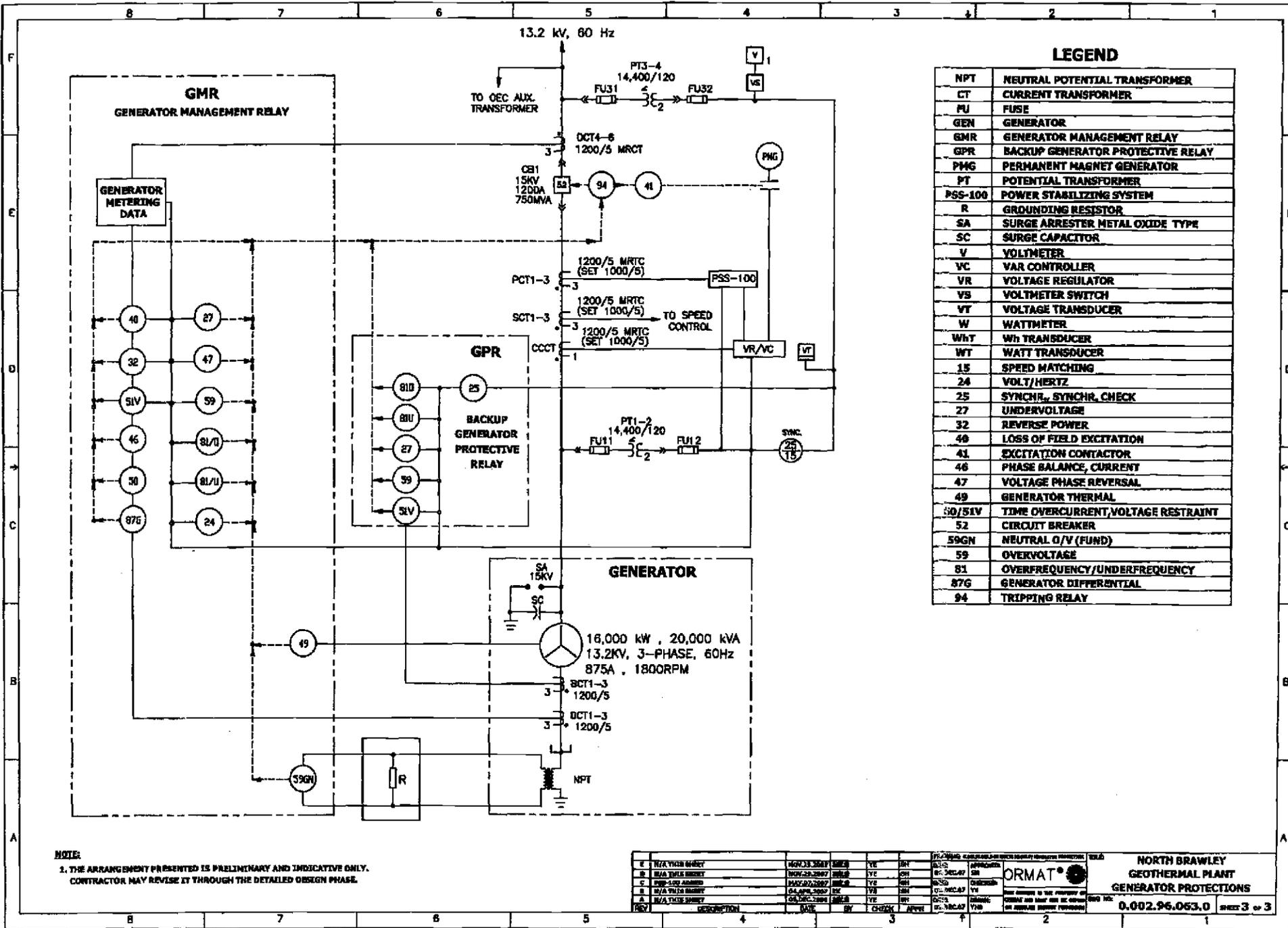
FUTURE CONNECTION TO SAW SWITCHING TO SAW SWITCHING (DRAWING: 0.002.98.010 SHEET 1 OF 3)



NO.	DATE	BY	CHKD	DESCRIPTION
1	08/25/2007	DRM	DRM	ISSUE FOR CONSTRUCTION
2	09/10/2007	DRM	DRM	REVISED FOR CONSTRUCTION
3	09/10/2007	DRM	DRM	REVISED FOR CONSTRUCTION
4	09/10/2007	DRM	DRM	REVISED FOR CONSTRUCTION
5	09/10/2007	DRM	DRM	REVISED FOR CONSTRUCTION
6	09/10/2007	DRM	DRM	REVISED FOR CONSTRUCTION
7	09/10/2007	DRM	DRM	REVISED FOR CONSTRUCTION

NOTES:

1. FINAL LINE HIGH VOLTAGE LEVEL IS SUBJECT TO IID INPUT.
2. THE ARRANGEMENT PRESENTED IS PRELIMINARY AND INDICATIVE ONLY. CONTRACTOR MAY REVISE IT THROUGH THE DETAILED DESIGN PHASE.



REV	DESCRIPTION	DATE	BY	CHECK	APPV	DATE	BY	CHECK	APPV
1	ISSUE FOR BIDDING	NOV 23 2007	SMH	YES	SMH				
2	ISSUE FOR BIDDING	NOV 23 2007	SMH	YES	SMH				
3	ISSUE FOR BIDDING	MAY 07 2007	SMH	YES	SMH				
4	ISSUE FOR BIDDING	JUL 04 2007	SMH	YES	SMH				
5	ISSUE FOR BIDDING	OCT 02 2006	SMH	YES	SMH				

FORMAT AND SHAW-WALKER INC. ORMAT
AN ASSOCIATED COMPANY OF ORMAT

**NORTH BRAWLEY
GEOTHERMAL PLANT
GENERATOR PROTECTIONS**

002.96.063.0

SHEET 3 OF 3

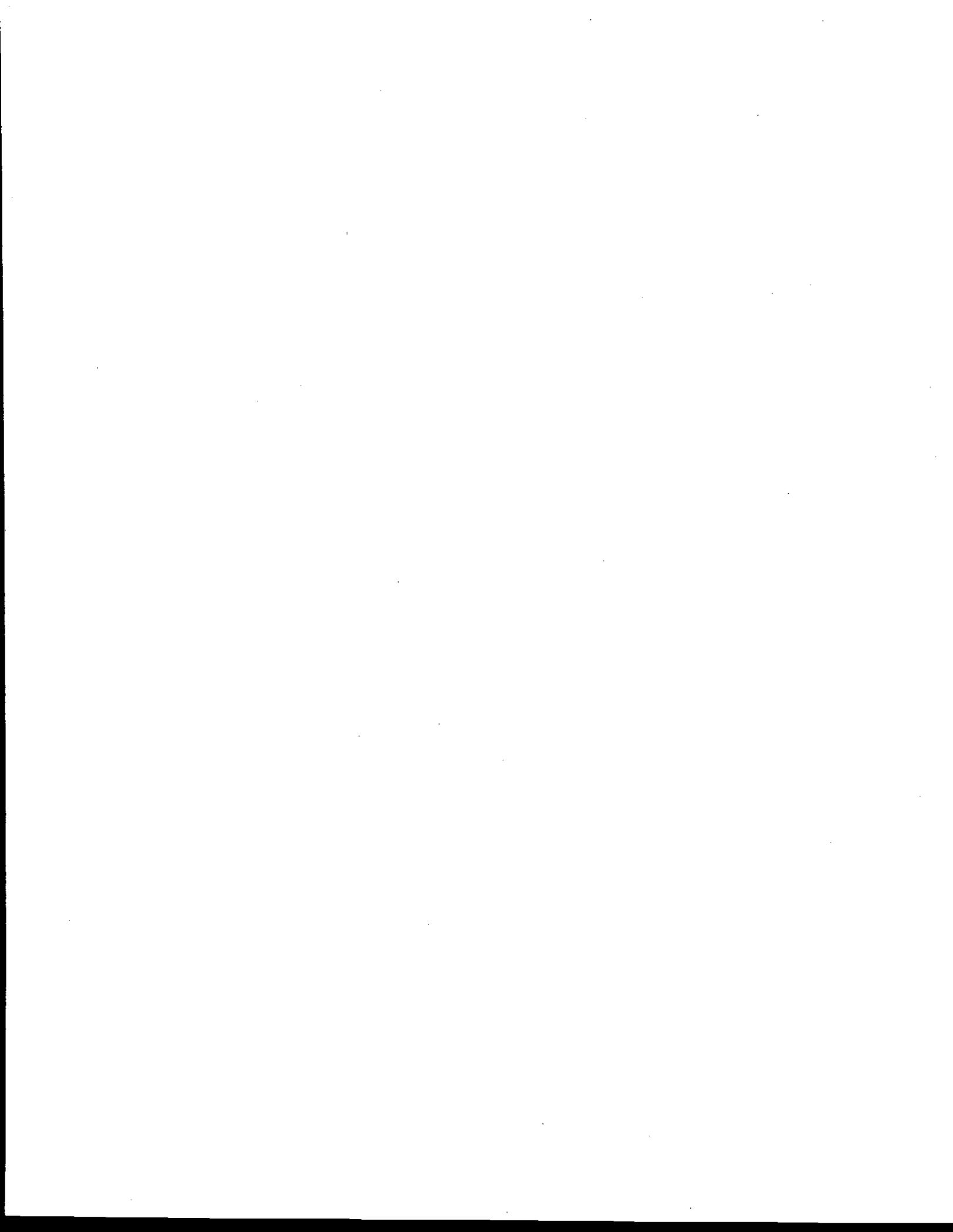
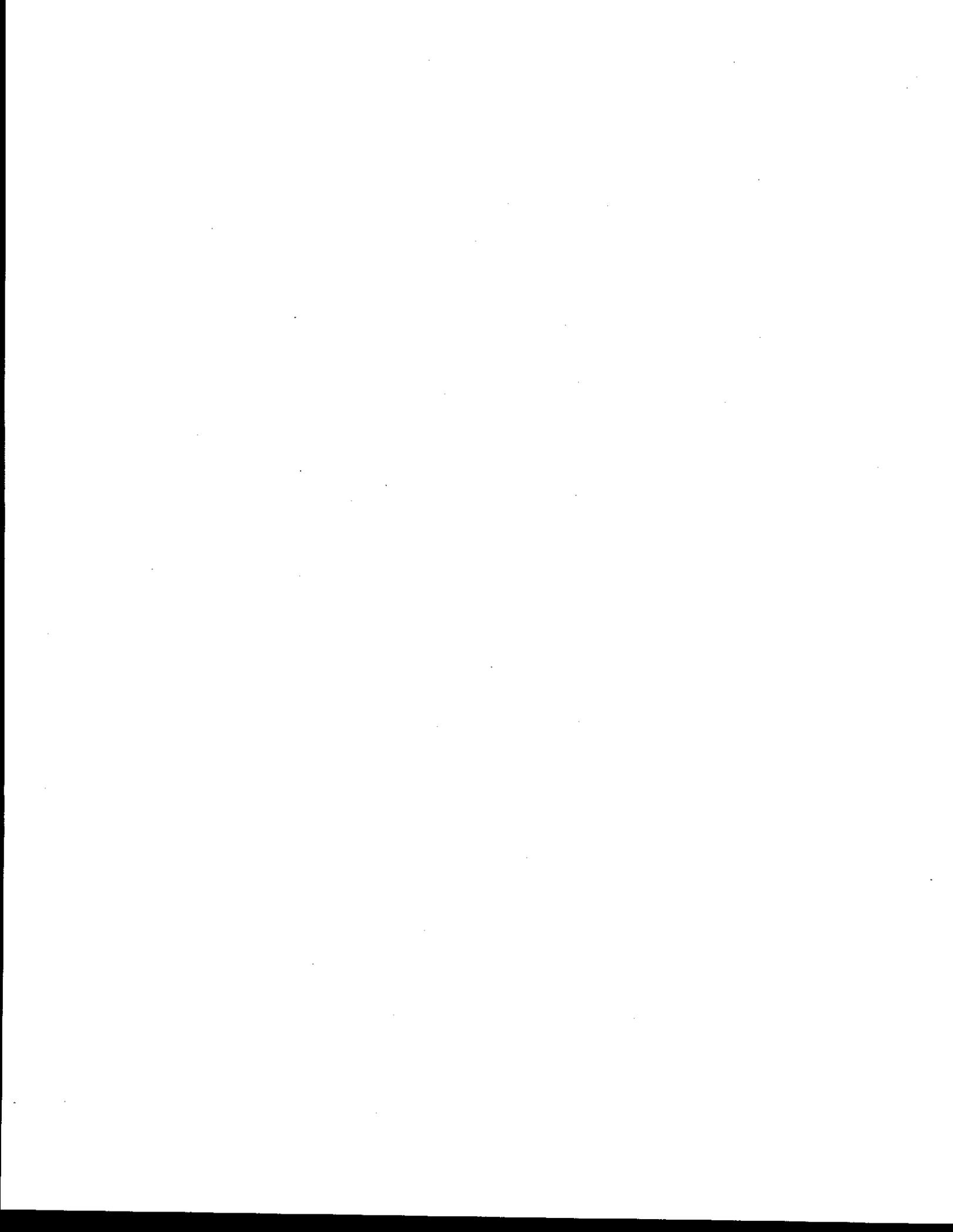


EXHIBIT 27



FIRST AMENDED AND RESTATED
ENGINEERING AND PROCUREMENT
AGREEMENT

BETWEEN

IMPERIAL IRRIGATION DISTRICT

AND

ORMAT NEVADA INC.

FOR THE

NORTH BRAWLEY GEOTHERMAL PROJECT

**FIRST AMENDED AND RESTATED
ENGINEERING AND PROCUREMENT AGREEMENT**
between
IMPERIAL IRRIGATION DISTRICT
and
ORMAT NEVADA INC.

THIS FIRST AMENDED AND RESTATED AGREEMENT is made and entered into this ____ day of May, 2008 (the "Effective Date") by and between Ormat Nevada Inc., a California corporation organized and existing under the laws of the State of California ("Interconnection Customer"), and Imperial Irrigation District, an irrigation district organized under the Water Code of the State of California, ("Transmission Provider"). Interconnection Customer and Transmission Provider each may be referred to as a "Party," or collectively as the "Parties."

RECITALS

WHEREAS, Interconnection Customer is proposing to develop a geothermal generating facility ("Generating Facility") or additional generating capacity to an existing Generating Facility consistent with the interconnection request submitted by Interconnection Customer dated December 13, 2007 (the "Interconnection Request"); and

WHEREAS, Interconnection Customer desires to interconnect the Generating Facility with the Transmission System; and

WHEREAS, Transmission Provider has completed an interconnection system impact study (the "System Impact Study") and provided the results of said study to Interconnection Customer; and

WHEREAS, Interconnection Customer has requested Transmission Provider to perform an interconnection facilities study (the "Interconnection Facilities Study") to specify and estimate the cost of the equipment, engineering, procurement and construction work needed to implement the conclusions of the System Impact Study to physically and electrically connect the Generating Facility to the Transmission System; and

WHEREAS, In parallel with the performance of the Interconnection Facilities Study, Interconnection Customer has authorized the Transmission Provider to begin engineering and procurement of long lead-time items necessary for the establishment of the interconnection in order to advance the implementation of the Interconnection Request; and

WHEREAS, This Agreement is subject to the terms and conditions set forth in Transmission Provider's Open Access Transmission Tariff (the "OATT"), including any future amendments thereto, and the OATT is hereby incorporated herein by reference;

WHEREAS, Capitalized terms used herein but not expressly defined herein shall have the meanings set forth in Transmission Provider's Generator Interconnection Procedure (the "GIP"), including any future amendments thereto, and the GIP is hereby incorporated herein by reference; and

WHEREAS, this Agreement supersedes and replaces the Engineering and Procurement Agreement dated on or about March 14, 2008 between the Parties.

NOW, THEREFORE, in consideration of and subject to the mutual covenants contained herein the Parties agreed as follows:

- 1.0 Voluntary Agreement.** Interconnection Customer acknowledges and understands that Transmission Provider is not required to enter into this Agreement, or any other engineering and procurement contract, but Transmission Provider is doing so voluntarily in the spirit of cooperation. Interconnection Customer also acknowledges and understands that this agreement is not a formal interconnection agreement, but is merely an interim contract, and that Interconnection Customer is still required to execute a definitive Generator Interconnection Agreement with Transmission Provider.
- 2.0 Queue Position.** The Parties acknowledge and agree that this Agreement will not impact Interconnection Customer's queue position or the Generating Facility's in-service date.
- 3.0 Authorization to Proceed; Costs and Expenses.** As of the Effective Date, Interconnection Customer authorizes Transmission Provider to proceed with the authorized activities identified in Attachment A hereto (the "Authorized Activities"). Interconnection Customer agrees to pay all costs and expenses directly related to the Authorized Activities. Interconnection Customer shall provide an initial deposit in the amount of \$869,758.00 which Transmission Provider may draw upon as necessary to fund each Authorized Activity. If additional monies are required to complete the Authorized Activities, then Transmission Provider shall promptly notify Interconnection Customer, and Interconnection Customer agrees to make a second deposit to cover such additional costs and expenses. Transmission Provider shall be under no obligation to perform any Authorized Activity unless Interconnection Customer shall have deposited adequate funds to pay for such work.
- 4.0 Estimates Only.** Since Transmission Provider has no control over the cost of labor, materials or equipment furnished by others, or over the resources provided by others to meet proposed timetables, the estimated costs set forth in Attachment A and the estimated schedule set forth in Attachment B are furnished only for the convenience of Interconnection Customer. They are intended to reflect the costs and timetables of similar work under favorable conditions. Because of unforeseen contingencies

and other factors, the actual costs may be considerably higher or lower, and the actual completion date(s) may be considerably earlier or later. Therefore, the estimated costs and schedule are not a guarantee by Transmission Provider of the actual cost and time required to complete all of the Authorized Activities.

- 5.0 Statements; Surplus Funds.** Upon the completion of all Authorized Activities, Transmission Provider shall provide Interconnection Customer with an accounting of all costs incurred in performing said work in sufficient detail to allow verification of such costs. Such costs may include, but shall not be limited to, associated labor, materials and supplies, outside services, and administrative and general expenses. If there are surplus funds following the completion of all Authorized Activities, then the remaining monies shall be promptly refunded to Interconnection Customer without interest.
- 6.0 Periodic Updates.** Transmission Provider agrees to interface with a designated Interconnection Customer representative regarding the Authorized Activities, and to provide said representative with periodic updates on work schedules and milestones, as well as current and anticipated costs and expenses.
- 7.0 Standard of Care; Express Disclaimer.** Transmission Provider shall exercise the same degree of care, skill and diligence in the performance of the Authorized Activities as is ordinarily exercised by an irrigation district utility under similar circumstances. No other warranty, express or implied, is included in this Agreement, or in any drawing, specification or report produced pursuant to this Agreement. Further, Interconnection Customer acknowledges and agrees that this Agreement shall not be construed as confirming or endorsing in any manner or fashion the design of the Generating Facility, or as any warranty of safety, durability, reliability or suitability of the Generating Facility or installation thereof for any use, including the use intended by Interconnection Customer.
- 8.0 Termination.** This Agreement shall terminate automatically upon the completion of all Authorized Activities set forth in Attachment A, or upon the execution of the Generator Interconnection Agreement by both Interconnection Customer and Transmission Provider. Transmission Provider may terminate this Agreement early for cause upon five (5) days advance written notice in the event Interconnection Customer (a) fails to timely comply with any material requirement of this Agreement, (b) fails to meet any of the milestones specified in the GIP, or (c) fails to comply with any of the prerequisites specified in the GIP. Interconnection Customer may terminate this agreement early for cause upon five (5) days advance written notice in the event Transmission Provider fails to timely comply with any material requirement of this Agreement, or for convenience upon ten (10) days advance written notice. Upon termination

of this Agreement pursuant to this Article 8.0, the rights and obligations of the Parties hereunder shall terminate, except for (x) rights and obligations accrued as of the time of termination, (y) rights and obligations arising out of events occurring prior to the termination, and (z) all other rights and obligations of the Parties which by their terms survive termination or which by their nature or by implication are intended to survive termination.

- 9.0 Cancellation Costs.** In the event this Agreement is terminated early for cause by Transmission Provider, or terminated early for convenience by Interconnection Customer pursuant to Article 8.0 above, then Interconnection Customer shall pay any cancellation costs incurred by Transmission Provider for all equipment ordered prior to the termination date which cannot be reasonably mitigated. In the event this Agreement is terminated early for cause by Interconnection Customer pursuant to Article 8.0 above, then Transmission Provider shall bear all cancellation costs incurred for all equipment ordered prior to the termination date.
- 10.0 Treatment of Equipment.** In the event this Agreement is terminated early for cause by Transmission Provider, or terminated early for convenience by Interconnection Customer pursuant to Article 8.0 above, then Transmission Provider may elect the following if the equipment cannot be reasonably canceled:
- (a) Take title to the equipment, in which event Transmission Provider shall refund to Interconnection Customer any amounts paid by Interconnection Customer for such equipment, including delivery costs; or
 - (b) Transfer title to and deliver such equipment to Interconnection Customer, in which event Interconnection Customer shall pay any unpaid balance and cost of delivery for such equipment.
- 11.0 Indemnity.** The Parties shall at all times indemnify, defend, and hold the other Party harmless from, any and all damages, losses, claims, including claims and actions relating to injury to or death of any person or damage to property, demand, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the other Party's action or inactions of its obligations under this Agreement on behalf of the Indemnifying Party, except in cases of gross negligence or intentional wrongdoing by the Indemnified Party.
- (a) Promptly after receipt by an Indemnified Party of any claim or notice of the commencement of any action or administrative or legal proceeding or investigation as to which the indemnity provided for in this Agreement may apply, the Indemnified Party shall notify the Indemnifying Party of such fact. Any failure of or delay in such

notification shall not affect a Party's indemnification obligation unless such failure or delay is materially prejudicial to the Indemnifying Party.

- (b) The Indemnifying Party shall have the right to assume the defense thereof with counsel designated by such Indemnifying Party and reasonably satisfactory to the Indemnified Party. If the defendants in any such action include one or more Indemnified Parties and the Indemnifying Party, and if an Indemnified Party reasonably concludes that there may be legal defenses available to it and/or other Indemnified Parties which are different from or additional to those available to the Indemnifying Party, the Indemnified Party shall have the right to select separate counsel to assert such legal defenses and to otherwise participate in the defense of such action on its own behalf. In such instances, the Indemnifying Party shall only be required to pay the fees and expenses of one additional attorney to represent an Indemnified Party or Indemnified Parties having such differing or additional legal defenses.
- (c) The Indemnified Party shall be entitled, at its expense, to participate in any such action, suit or proceeding, the defense of which has been assumed by the Indemnifying Party. Notwithstanding the foregoing, the Indemnifying Party (i) shall not be entitled to assume and control the defense of any such action, suit or proceedings if and to the extent that, in the opinion of the Indemnified Party and its counsel, such action, suit or proceeding involves the potential imposition of criminal liability on the Indemnified Party, or there exists a conflict or adversity of interest between the Indemnified Party and the Indemnifying Party, in such event the Indemnifying Party shall pay the reasonable expenses of the Indemnified Party, and (ii) shall not settle or consent to the entry of any judgment in any action, suit or proceeding without the consent of the Indemnified Party, which shall not be unreasonably withheld, conditioned or delayed.
- (d) If an Indemnified Party is entitled to indemnification under this Agreement as a result of a claim by a third party, and the Indemnifying Party fails, after notice and reasonable opportunity to proceed, to assume the defense of such claim, such Indemnified Party may, at the expense of the Indemnifying Party, contest, settle or consent to the entry of any judgment with respect to, or pay in full, such claim.
- (e) If an Indemnifying Party is obligated to indemnify and hold any Indemnified Party harmless under this Agreement, the amount owing to the Indemnified Party shall be the amount of such Indemnified Party's actual Loss, net of any insurance or other recovery.

- 12.0 Consequential Damages.** In no event shall either Party be liable under any provision of this Agreement for any losses, damages, costs or expenses for any special, indirect, incidental, consequential, or punitive damages, including but not limited to loss of profit or revenue, loss of the use of equipment, cost of capital, cost of temporary equipment or services, whether based in whole or in part in contract, in tort, including negligence, strict liability, or any other theory of liability.
- 13.0 Confidentiality.** "Confidential Information" shall include, without limitation, all information relating to a Party's technology, research and development, business affairs, and pricing, and any information supplied or disclosed by either Party to the other prior to the execution of this Agreement. Information is Confidential Information only if it is clearly designated or marked in writing as confidential on the face of the document or, if the information is conveyed orally or by inspection, if the Party providing the information orally informs the Party receiving the information that the information is confidential. Confidential Information supplied or disclosed pursuant to this Agreement shall be subject to the confidentiality provisions set forth in the OATT.
- 14.0 Delay in Performance.** Neither Transmission Provider nor Interconnection Customer shall be considered in breach of this Agreement for delays in performance caused by circumstances beyond the reasonable control of the nonperforming party.
- 15.0 Obligations of the Parties.** The obligations of the Parties hereunder shall be several and not joint, and neither Party shall have any right, power or authority to enter into any agreement for, act on behalf of, or to act as an agent or representative of, or to otherwise bind or obligate the other Party. This Agreement shall not be interpreted or construed to create an agency, association, joint venture or partnership relationship between the Parties.
- 16.0 Third Party Rights.** This Agreement and all rights hereunder are intended for the sole benefit of the Parties and, to the extent expressly provided, for the benefit of the Indemnified Parties, and shall not imply or create any rights on the part of, or obligation to, any other person or entity.
- 17.0 Assignment.** Neither Party shall voluntarily assign its rights nor delegate its duties under this Agreement, or any part of such rights or duties, without the written consent of the other Party, which consent shall not be unreasonably withheld, except in connection with the sale, merger, or transfer of a substantial portion of its assets and/or properties (or in the case of Transmission Provider, its transmission facilities) so long as the assignee in such a sale, merger, or transfer assumes directly all rights, duties and obligations arising under this Agreement. Any such assignment or delegation made without such written consent or assumption, as the case may be, shall be null and void.

- 18.0 Dispute Resolution.** Disputes under this Agreement shall be resolved in accordance with procedures set forth in the OATT. The Parties acknowledge and agree that arbitration under the OATT is discretionary. In the event the designated senior representatives of Interconnection Customer and Transmission Provider are unable to resolve a dispute by mutual agreement within thirty (30) days (or such other period as the Parties may agree upon), nothing in this Article 18.0 shall restrict either Party from thereafter electing to resolve the dispute in state or federal court located in Imperial County, California.
- 19.0 Governing Law.** The validity, interpretation and performance of this Agreement and each of its provisions shall be governed by the applicable laws of the State of California without regard to its conflicts of law provisions.
- 20.0 Amendments.** No alterations or amendment of this Agreement shall be binding on either Party unless reduced to writing and signed by the authorized representative of Interconnection Customer and the authorized representative of Transmission Provider. The terms and conditions of this Agreement shall be amended, as mutually agreed to by the Parties, to comply with changes or alterations made necessary by any valid applicable order of any Governmental Authority, or any court, having jurisdiction over this Agreement.
- 21.0 Integration.** This Agreement constitutes the entire and integrated agreement between Interconnection Customer and Transmission Provider. It supersedes all prior and contemporaneous communications, proposals, representations, negotiations or agreements, whether written or oral, relating to the subject matter of this Agreement.

* * *

IN WITNESS WHEREOF, the Parties have caused this Agreement to be duly executed by their duly authorized officers or agents on the day and year first above written.

IMPERIAL IRRIGATION DISTRICT

By: 

Name: David L. Barajas

Title: Gen. Supt. Transmission Planning and Contracts

Date: June 12/08

ORMAT NEVADA INC.

By: 

Name: Robert Sullivan

Title: Authorized Representative

Date: 29 May 08

ATTACHMENT A

Authorized Activities

A short circuit study and breaker capability analysis has been performed to determine the impact of the additional North Brawley generation facility to the IID Energy transmission system (*North Brawley System Impact Study Report dated December 11, 2007*).

The analysis identified the interrupting capability of two (2) IID Energy owned breakers, H40 and H50, at the Euclid Substation exceed the interrupting capabilities. To mitigate the impacts Ormat Nevada Inc. authorizes IID Energy to proceed with all the required activities required to procure the following:

1. Quantity of two (2) high voltage three phase, sulfur hexafluoride, 121kV, 550kV BIL, 60 Hertz, 2000 Ampere, 40kA Interrupting, Dead Tank Power Circuit Breakers with Synchronous Switching Control at an estimated cost of \$55,447.00 each for a total of \$110,894.00.

ATTACHMENT A - FIRST AMENDMENT AND RESTATMENT

Following the results of the *Facility Study Draft dated April 24, 2008*, other requirements must be met to interconnect the North Brawley generating facility with the IID Energy electrical grid. To mitigate the impacts, Ormat Nevada Inc. authorizes IID Energy to proceed with all the activities required to procure and engineer the following:

2. 92kV line tap equipped with a group operated disconnect switches at an estimated cost of \$194,641.00.
3. 92kV line protection panel commissioning and testing and fiber optic multiplexing equipment for current differential relaying at an estimated cost of \$154,792.00.
4. Remote relay replacement at an estimated cost of \$26,809.00, see note 1.
5. Coordination study to determine the appropriate settings for all protective equipment at an estimated cost of \$15,000.00.
6. Special Protection Schemes (SPS) design and installation at an estimated cost of \$250,000.00.
7. SCADA and Revenue Metering at an estimated cost of \$36,276.00.
8. Communications and Fiber Optic at an estimated cost of \$63,994.00.
9. Project Commissioning at an estimated cost of \$0.00, note 2.
10. Euclid H20 and H50 Circuit Switcher Replacement at an estimated cost of \$28,246.00, see note 3.
11. Expediting charges for the procurement of equipment at an estimated cost of \$100,000.

Authorized Activities Total: \$869,758.00

Notes:

1. Interconnection Customer will contract this portion of work which includes engineering and material procurement. Transmission Provider will approve the design and procurement.
2. Interconnection Customer will allocate Project Commissioning cost to Transmission Provider for the Construction Phase of the project.
3. Interconnection Customer to replace two new circuit switchers at current market value. Transmission Provider will install two circuit switchers from stock. Interconnection Customer has remitted \$110,894.00 for reservation of the two circuit switchers stocked by Transmission Provider. Remaining costs are for engineering review by Transmission Provider.

ATTACHMENT B

Schedule

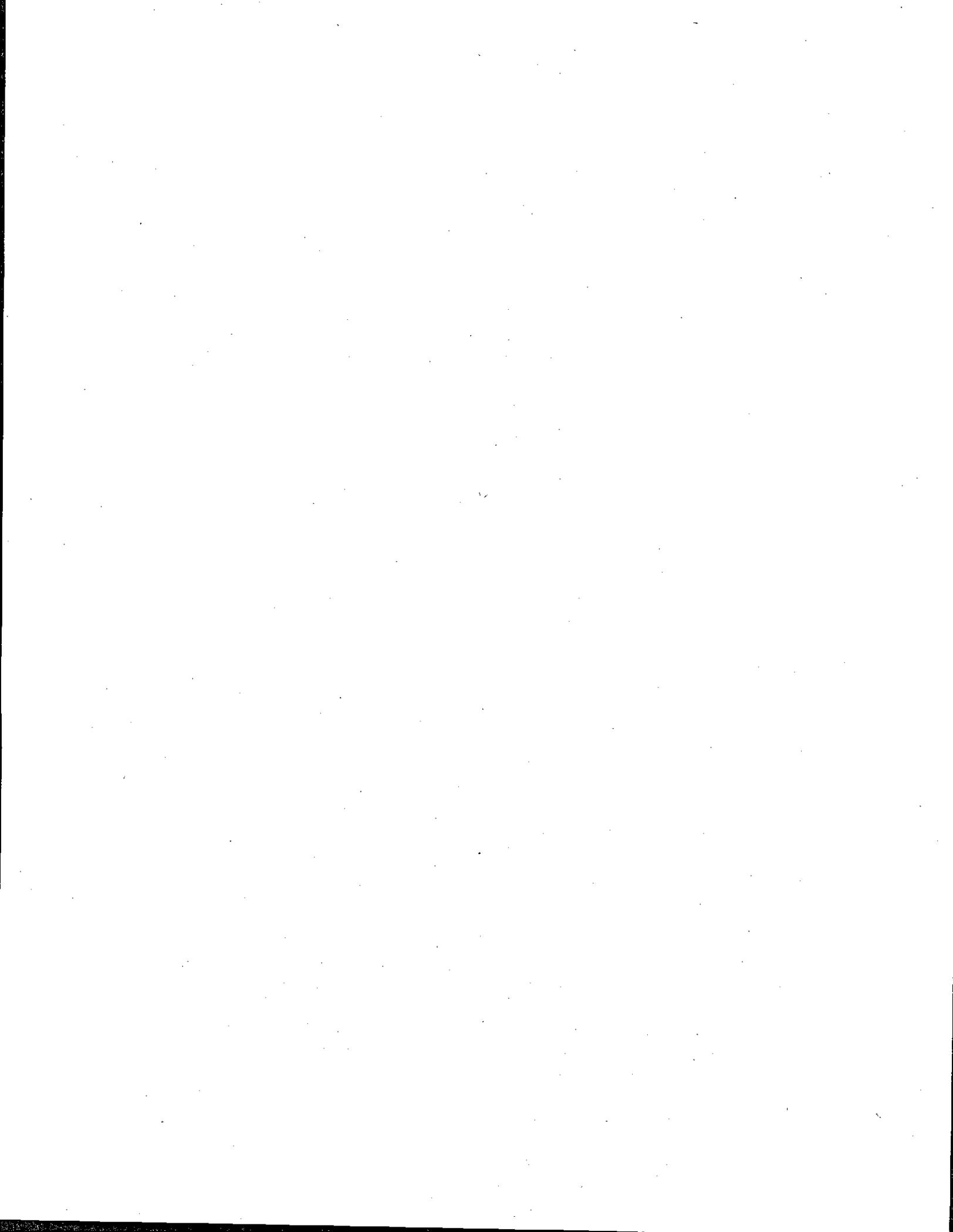
- (1) The Schedule below lists the activities required to procure two (2) high voltage three phase, sulfur hexafluoride, 121kV, 550kV BIL, 60 Hertz, 2000 Ampere, 40kA Interrupting, Dead Tank Power Circuit Breakers with Synchronous Switching Control.

Material - 92kv Breakers	32w	03/10/08	08/25/08
Prepare Purchase Order	3w	03/10/08	03/17/08
Manufacturing/Delivery	29w	03/17/08	08/17/08
Prepare Approval Drawings	6w	03/17/08	04/14/08
Review Approval Drawings	3w	04/14/08	04/16/08
Issue Final Drawings	4w	04/16/08	05/05/08
Delivery - 92kV Breakers	16w	05/05/08	08/25/08

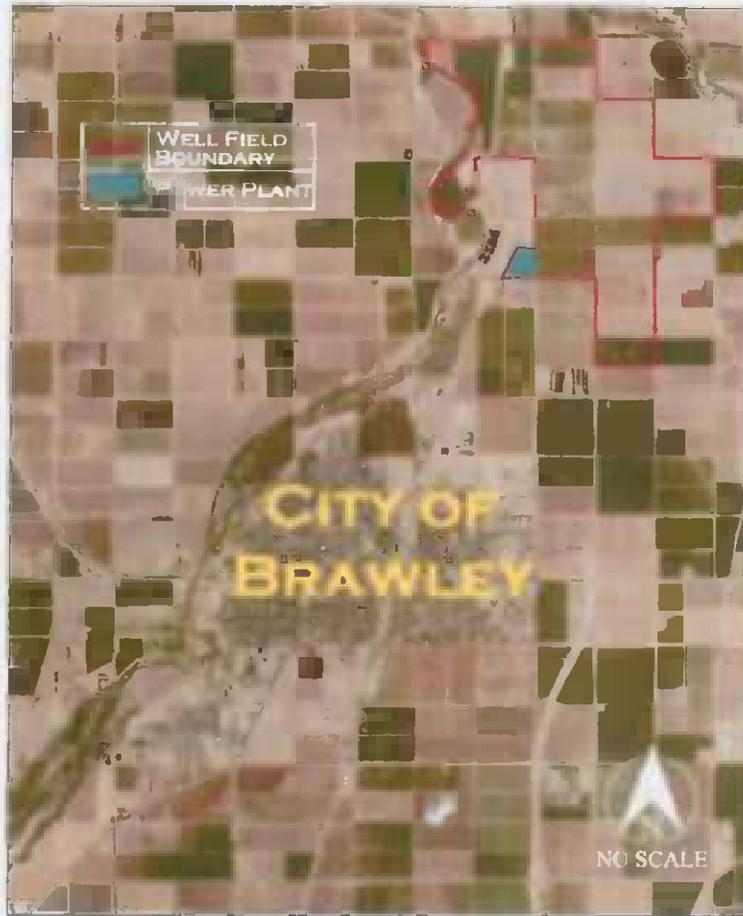
- (2) The Schedule below lists the activities necessary to meet the requirements of the Facility Study Draft:

Additional Modifications	22w	05/14/08	10/15/08
92kV Line Tap	22w	05/14/08	10/15/08
92kV Line Protection Panel	20w	05/14/08	10/01/08
Remote Relay Replacement	20w	05/14/08	10/01/08
Coordination Study	4w	05/14/08	06/11/08
SPS Design & Installation	20w	05/14/08	10/01/08
RTU Engineering & Installation	20w	05/14/08	10/01/08
Revenue Metering	22w	05/14/08	10/15/08

EXHIBIT 28



**East Brawley Geothermal Development Project
SB 610 - Water Supply Assessment**



BASE MAP SOURCE: LANDISCOR, INC.

Prepared For:

**Ormat Nevada, Inc.
6225 Neil Road
Reno, NV 89511**

Prepared By:



**1065 State Street
El Centro, CA 92243
Phone: 760-353-8110**

**Contact: Derek Dessert, Associate Planner
December 11, 2008**

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Acknowledgement Section

Credits, Acknowledgements, and Contributors

We wish to thank the staffs of Imperial County Planning and Development Services and Imperial Irrigation District (IID) for their assistance and support in providing information that was essential to the preparation of this report.



Imperial County Planning & Development Services

801 Main Street
El Centro, CA 92243



Imperial Irrigation District Operating Headquarters

333 E. Barioni Boulevard
Imperial, CA 92251

Purpose

This Water Supply Assessment Plan was prepared for Imperial County Planning and Development Services by Development Design & Engineering, Inc. regarding the East Brawley Geothermal Development Project (EBGDP). This study is a requirement of California law, specifically Senate Bill 610 (referred to as SB 610). SB 610 is an act that amended Section 21151.9 of the Public Resources Code, and Sections 10631, 10656, 10910, 10911, 10912, and 10915 of the Water Code. SB 610 repealed Section 10913, and added and repealed Section 10657 of the Water Code. SB 610 was approved by the Governor and filed with the Secretary of State on October 9, 2001, and became effective January 1, 2002.

Under SB 610, water supply assessments must be furnished to local governments for inclusion in any environmental documentation for certain projects (as defined in Water Code 10912 [a]) subject to the California Environmental Quality Act. Due to increased population and water demands, this water bill seeks to improve the link between information on water availability and certain land use decisions made by cities and counties. SB 610 takes a significant step toward managing the demand of California's water supply as it provides regulations and incentives to preserve and protect future water needs. Ultimately, this bill will coordinate local water supply and land use decisions to help provide California's cities, farms, rural communities and industrial developments with adequate water supplies.

Project and Subdivision Determination According to SB 610

Senate Bill 610- Water Supply Assessment

With the introduction of SB 610, any project under California Environmental Quality Act (CEQA) shall provide a Water Supply Assessment if:

- The project meets the definition of the Water Code Section 10912¹

¹ Water Code Section 10912:

For the purposes of this part, the following terms have the following meanings:

(a) "Project" means any of the following:

- (1) A proposed residential development of more than 500 dwelling units.*
- (2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.*
- (3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.*
- (4) A proposed hotel or motel, or both, having more than 500 rooms.*
- (5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.*

(6) A mixed-use project that includes one or more of the projects specified in this subdivision.

(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

(b) If a public water system has fewer than 5,000 service connections, then "project" means any proposed

After review of Water Code Section 10912 the EBGDP is deemed a "project" because it proposes a demand of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system's existing service connections.

Executive Summary

Imperial County Planning and Development Services requested a Water Supply Assessment as part of the environmental review for the EBGDP. This study is intended for use by the County of Imperial in its evaluation of water supplies for existing and future land uses. The evaluation examines the following water issues:

- **Water availability during a normal year (See Section 1)**
- **Water availability during multiple dry water years (See Section 2)**
- **Water availability during a 20-year projection to meet existing demands (See Section 3)**
- **Expected demands of the project (See Section 4)**
- **Reasonably foreseeable planned future water demands to be served by Imperial Irrigation District (See Section 5)**

Based on IID's apportionment, 3,100,000 acre-feet of Colorado River water per year, and adoption of IID Resolution 22-2008, which includes an Equitable Distribution Plan to be used in the instance of an SDI, Imperial Unit water supply is adequate to service municipal and industrial water users. IID approved the Negative Declaration (ND) for the Equitable Distribution Plan and determined that the ND provided a sufficient assessment of the environmental impacts of the Equitable Distribution Plan pursuant to CEQA, and that there was no substantial evidence that the Equitable Distribution Plan will have a significant effect on the environment. Since its inception in 1911, IID has never been denied the right to divert the amount of water it has requested for agricultural purposes to other beneficial uses. As long as the appropriate infrastructure for service and conservation measure(s) for system impacts are in place, the amount of water available and the stability of the water supply chain ensure that this development's water needs will be met for the next 20 years.

The area that would be taken out of agricultural production as a result of the EBGDP is estimated to use 916 acre-feet per year as farmland based on the calculation in Section 4 of this report, which uses a consumption rate of 5.13 acre-feet per acre annually. Based on the history of water delivered to the same area by IID from 1998 to 2007, on average the project site has received 1,034 acre-feet per year. A change in land use from agricultural to industrial for the area that would be taken out of agricultural production as a result of the EBGDP results in an annual consumption of 5,500 acre-feet per year. This is an increase of 500.44 +/- and 431.91 +/- percent when compared to the annual water usage for the area that would be taken out of agricultural production as a result of the EBGDP based on a consumption rate of 5.13 acre-feet per acre per year, and the average of IID's 10-year annual delivery history for the same area respectively.

Project Description

ORNI 19, LLC, a wholly subsidiary of Ormat Nevada, Inc. (Ormat), proposes to build the EBGDP in the vicinity of the Brawley 2 Geothermal Exploration Project covered under Conditional Use Permit #07-0029 and the Final Environmental Impact Report (FEIR) dated April 1979 and approved by the Board of Supervisors, which analyzed up to 800 megawatts for the Geothermal Overlay Zone (g-zone). The EBGDP, which includes the following facilities, would be located on private agricultural lands just north of the City of Brawley in Sections 10, 11, 14, 15, 16, 21, 22, and 23 Township 13 South, Range 14 East, San Bernardino Base and Meridian (SBM):

- A 49.9 net MW geothermal power plant consisting of up to six (6) OEC binary generating units (12.5 MW gross each) with vaporizers, turbines, generators, condensers, preheaters, pumps and piping, motive fluid (isopentane) storage, a motive fluid vapor recovery system (VRU), a gas scrubber, and possibly a regenerative thermal oxidizer (RTO) and related ancillary equipment;
- Two (2) cooling tower batteries with a total of 14-20 cell counter flow, induced draft with drift eliminators of 0.0005 efficiency;
- A control room, office maintenance shop, parking, and other facilities located at the power plant site;
- Approximately 60 total wells, approximately half for production and half for injection. The final number of wells will be determined by drilling results. Each well will average 4,500 feet in depth. Production wells will have a gas separator and corrosion and scale inhibitor and geothermal fluid booster pump to pump the fluid to the power plant. The production wells will also have a sand separator;
- Piping from production wells to the power plant and from the power plant to the individual injection wells. Gas pipelines will take gas contained in the brine from the gas separators to either the injection wells or to the gas scrubber at the power plant;
- Blowdown wells (2-4) at the power plant site to provide for injection of the cooling tower blowdown;
- Pumps, tank, valves, controls, flow monitoring and other necessary equipment to the wells and pipelines;
- Maintenance of the production and injection wells cited above;
- Piping, canals or ditches and pumps to bring water from IID's Rockwood Canal to the power plant;
- A substation with a 2 mile long double circuit 13.8 and 92 kilovolt (kV) transmission line with 66 foot high poles to interconnect to the IID at the North Brawley 1 substation at Hovley and Andre Roads. It will span the New River; and
- Communication Tower on the plant site to facilitate communications for a central control room, location yet to be determined, for all Imperial Valley operations.

The EBGDP power plant is proposed on private agricultural land in the southeast corner of Section 15, Township 13 South, Range 14 East, SBB&M identified by Assessor's

Parcel Number 037-140-006-000. The total area of the site where the power plant is proposed is 32.75 acres +/- . It would be enclosed by a 6 foot wire fence in an area approximately 900 by 600 feet not including the substation or Stormwater retention basin. The main entrance to the power plant would be off Best Road just north of Ward Road from a left hand turn pocket built for this project. It would be necessary to cover Best Canal along the property frontage to accommodate widening of the road for the turn pocket. Emergency access would be from Best Road into the south end of the property on the north side of the Livesley Drain. The emergency access road would be constructed with an all-weather surface and lead to a locked gate that can be opened by any emergency responders. Both entrances into the plant site would provide access from the new Highway 111 bypass that would include an exit onto Best Road just south of Shank Road. Traffic would come from Interstate 8, north of Highway 111 to Best Road. See **Figures 1, 2, 3, 4 and 5** for the State of California Project Location Map, Project Location Relative to the City of Brawley, Aerial and Regional Site Map, Power Plant and Well Field Site Map, and East Brawley General Arrangement Power Plant Layout.

Well Field

The well field would be located between Rutherford on the north, Dietich Road on the east, the New River on the west, and just north of Shank Road on the south. Access to the wellpads and pipelines would be from Best Road, Baum Road (not a county road), Groshen Road, Kerhsaw Road, Rutherford Road, Ward Road, and Willis Roads. Additionally, private farm roads and portions of IID right-of-ways for vehicular use may be used for access. Encroachment permits for ingress/egress and irrigation canal and drain crossings would be obtained from Imperial County Public Works and IID as applicable. Access to farm land would be coordinated with landowners to minimize impacts to farming operations. Wellpads and pipelines would be along the edges of fields. New access roads would be constructed or improved only as needed to safely accommodate traffic required for wellpad construction, well drilling and maintenance of wells and roads. Road widths to well pads would typically be no less than ten feet.

Power Plant

The power plant consists of up to (6) Ormat Energy Converters (OECs) that would each operate independently, but would share common ancillary components such as isopentane storage, geothermal brine supply and injection, substation, etc. Geothermal fluids from production wells would flow through level 1 and level 2 vaporizers and preheaters of each OEC unit, transferring the heat to the isopentane motive fluid through the OEC's shell and tube heat exchangers. The cooled geothermal brine would then be sent to the geothermal brine injection system without coming into contact with the atmosphere, a closed loop system.

The vaporized isopentane working fluid from the level 1 and level 2 vaporizers would turn the level 1 and level 2 turbines which together turn a common generator that produces electricity that is delivered to the substation where it is delivered to the transmission lines. The vaporized isopentane is then condensed in a shell and tube

condenser and returned to the preheaters and vaporizers to repeat the cycle. The use of isopentane is therefore a closed-loop system, with no significant, routine release or discharge of isopentane.

The isopentane vapor condensate is cooled by water circulating from the cooling tower. Water from the condensers is cooled in the cooling tower by evaporating the circulating water. Water from the cooling tower and the make-up water replace the evaporated water that would be obtained under contract from the IID. Binary power plants such as this are closed loop systems such that geothermal brine produced from the geothermal reservoir is injected in whole back into the geothermal reservoir. Therefore, a brackish water supply is needed for the cooling system. This is different from a geothermal flash plant where the condensed steam is used for the cooling water. Flash plants are used on higher temperature geothermal resources than is the case with this resource.

Figure 4 shows the routing for a water pipeline from the IID's Rockwood Canal at Gate 131. Although the Best Canal is closer to the site for the proposed power plant, IID has indicated it does not have the capacity to deliver water from this canal due to changes that have occurred to the canal south of the City of Brawley. A small portion of the circulating water would be injected into the geothermal reservoir via dedicated cooling tower blowdown wells adjacent to the plant site. The cooling tower blowdown removes the dissolved solids from the water that are concentrated as the water is cycled or reused in the cooling tower. The estimated amount of water required for this plant is 5,500 +/- acre feet per year. Ormat is also working with the City of Brawley to obtain water from their treatment plant. The City would be required to perform their own analysis of this project should the City Council approve the concept. The water from the Rockwood Canal would be gravity fed or pumped in a 20 - 36 inch pipeline this is either underground or put inside the Livesley Drain that runs between the canal and the proposed power plant perpendicularly. Construction of the power plant would take approximately 15 months and require approximately 200 workers at peak construction.

Gas Scrubber

The proposed scrubber is designed to remove benzene and other geothermal noncondensable gases (NCGs) from the high-pressure noncondensable gas stream and dissolve them into the scrubber liquid which is then injected into the geothermal reservoir where the NCGs originated. The packed-bed column is a counter-flow device made up of an inert, solid material, probably stainless steel, which is randomly packed to provide a bed of uniform porosity and a very large surface area over which the liquid and gases have intimate contact. The base scrubber is a sump that collects the scrubbing liquid with the dissolved gases for removal to the cooling tower blowdown injection well. The packing is supported above this sump by a structure that uniformly distributes that gas across the packing and maintains uniform gas velocities. After passing through the bed but before exiting the scrubber outlet a demister is used to prevent carryover of the scrubbing liquid (cooling tower blowdown water) in the gas stream leaving the scrubber. This demister used the liquid drop's inertia to contact the demister, coalesce, and fall back into the packed bed. The scrubbed gases which dissolve in the cooling tower

blowdown water would be injected with the cooling tower blowdown water into dedicated injection well(s). The scrubbed NCGs which do not dissolve in the scrubbing liquid would be discharged into the atmosphere through a vent gas stack.

Cooling Water System

The cooling water system will consist of standard wet cooling tower technology with enhancements to reduce water consumption. The cooling system may also include dry cooling towers to act as a hybrid system in tandem with wet cooling towers to reduce water consumption during winter months. Blowdown water treatment for reuse is also an option to reduce water consumption. Each of the two (2) 8 to 10-cell cooling towers would circulate an average of approximately 240,000 +/- gallons per minute (gpm) of cooling water to its associated OEC Units. An average of approximately 2,485 +/- gpm of circulating water would be evaporated from both cooling towers, and both would also blowdown (discharge) an average of approximately 975 +/- gpm. To maintain its water balance both cooling towers would require an average of approximately 3,460 +/- gpm of cooling tower makeup water, which equates to 5,500 +/- acre-feet per year for the entire project. This water would be obtained via the IID canal system. Sodium hypochlorite (bleach) will be used for bacterial control in the towers as well as other chemicals for pH control and corrosion inhibition.

Water Alternatives

The project's water consumption would be met by the IID through their current resources, transfers from other sources, or would be offset through water conservation projects identified and approved by IID. Water taken from IID would be subject to the approved Equitable Distribution Program during years of Supply Demand Imbalance (SDI).

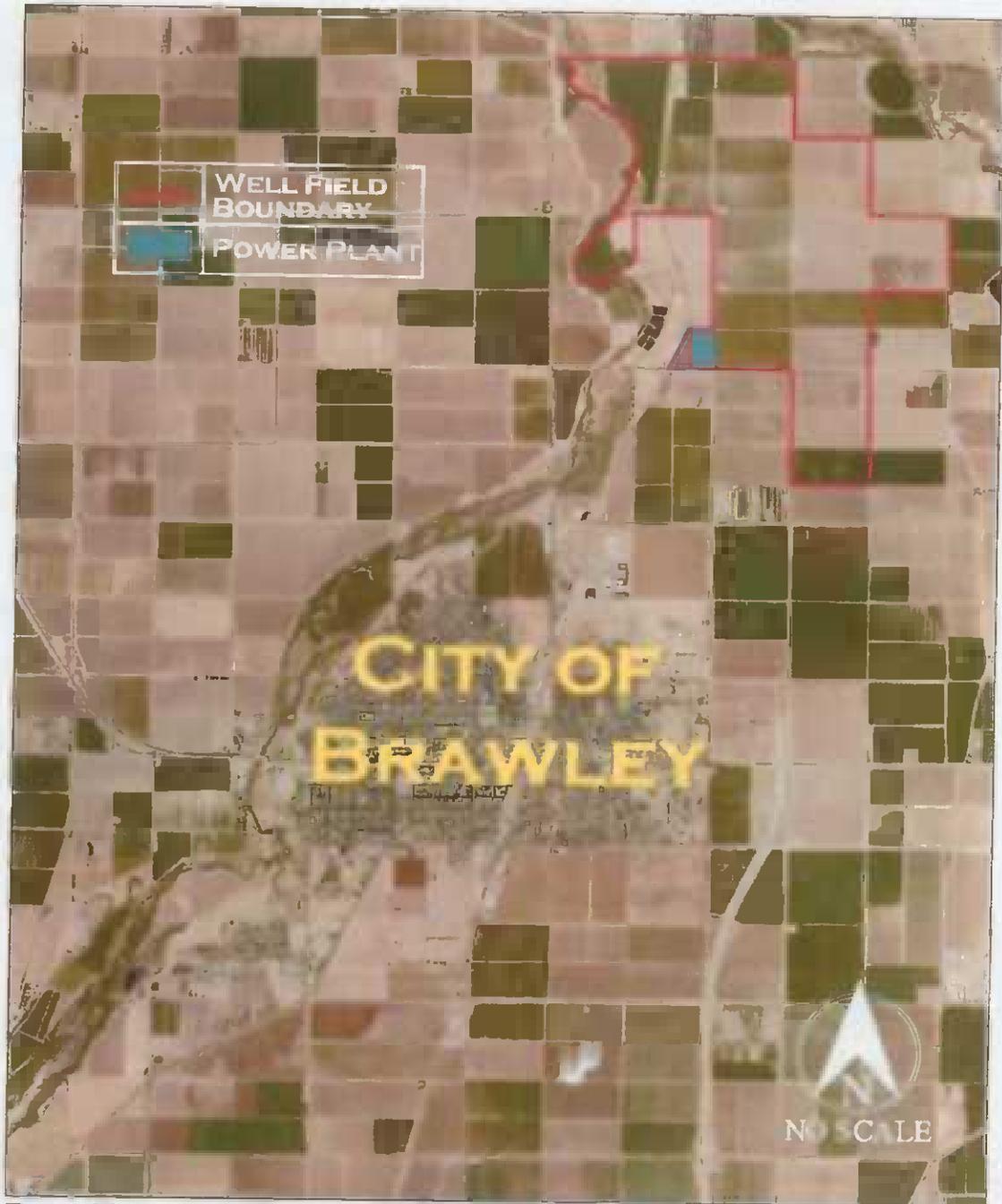
Non-Cooling Water

Ormat would supply bottled drinking water for the employees that work at the project. The IID water that would come to the plant for cooling would also be used for the control room building and labeled as non-potable. The project is not scheduled to have more than 25 employees during normal operations.

Figure 1: State of California Project Location Map



Figure 2: Project Location Relative to the City of Brawley



BASE MAP SOURCE: LANDISCOR, INC.

Figure 3: Aerial and Regional Site Map

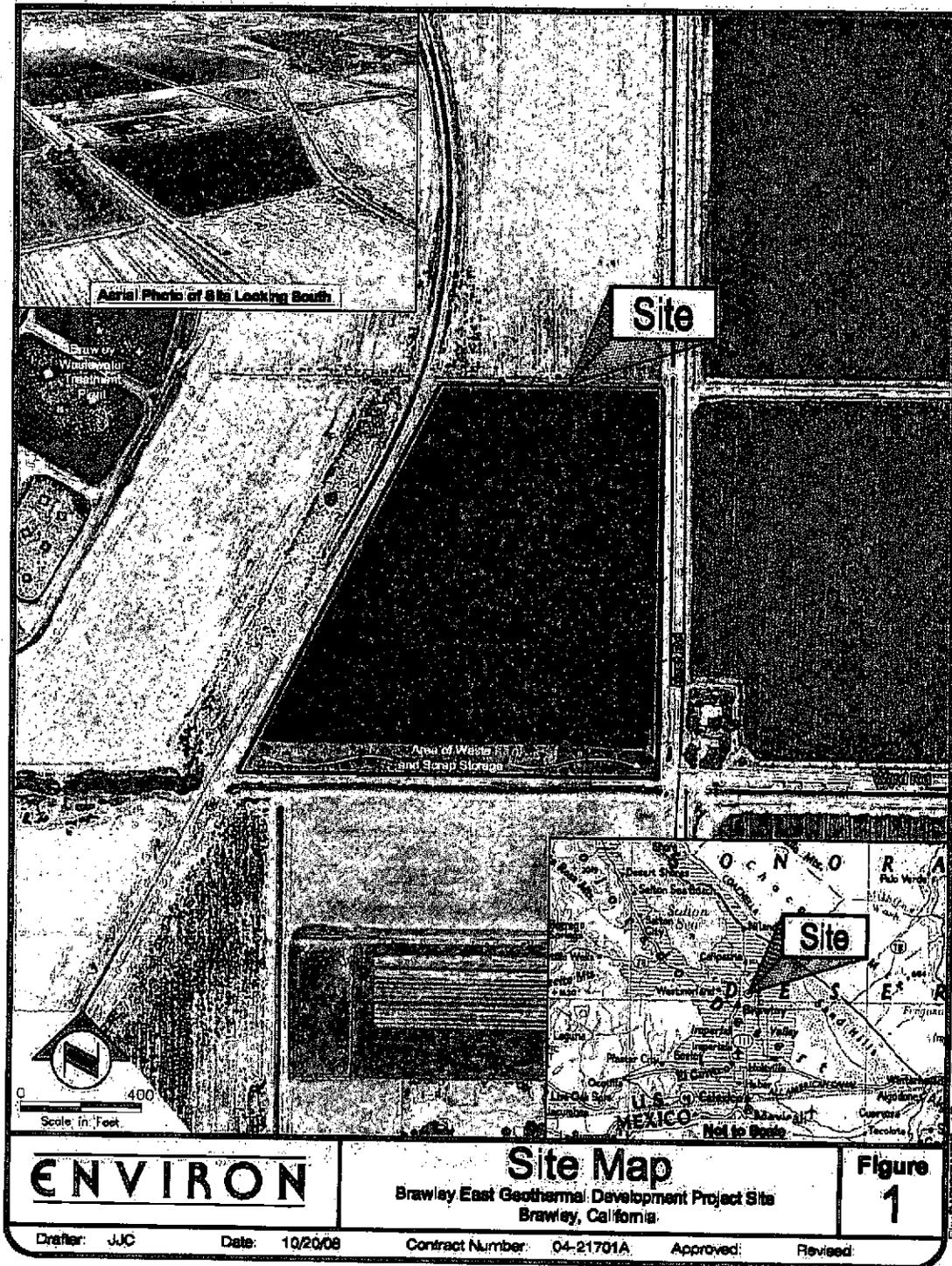


Figure 4: Power Plant and Well Field Site Map

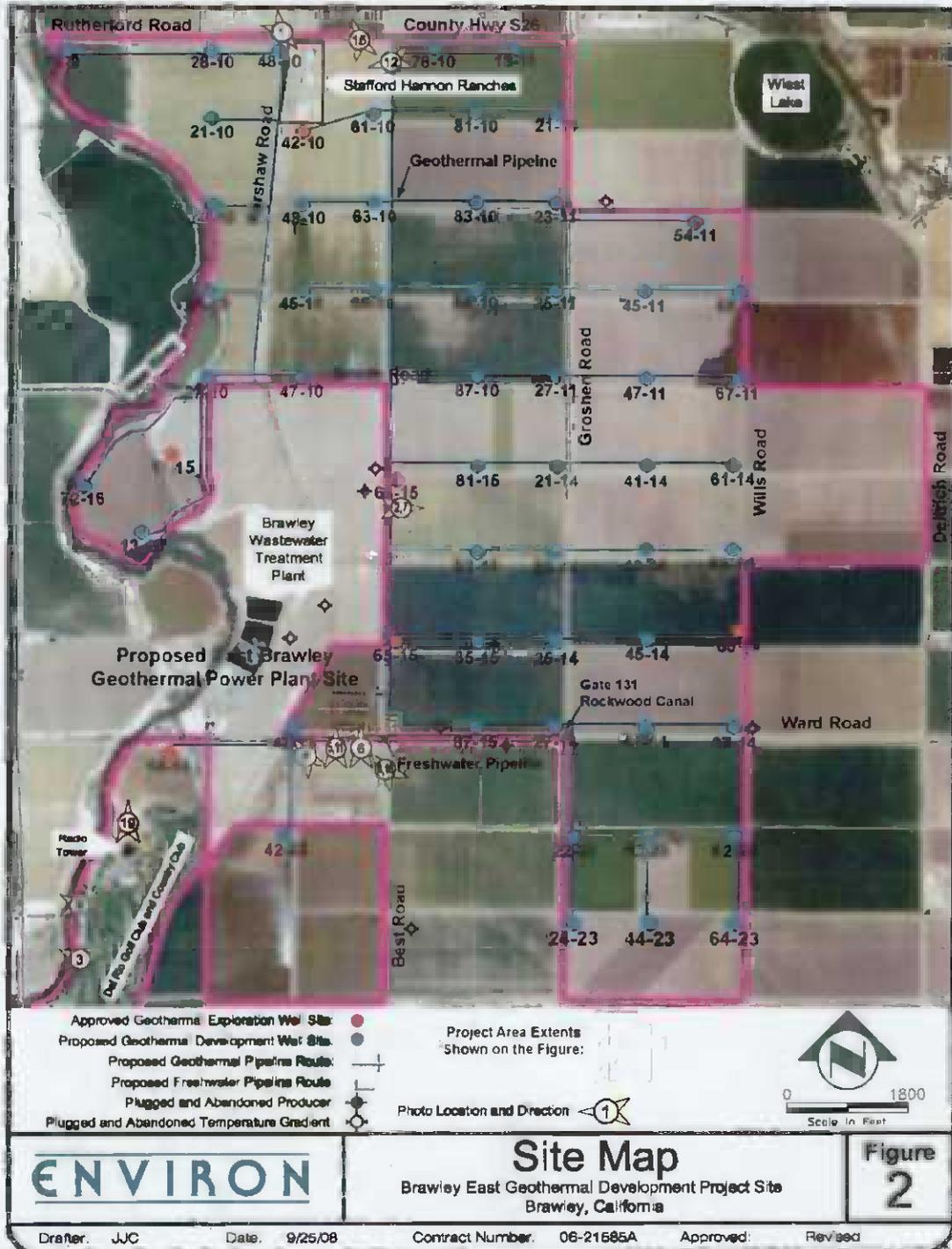
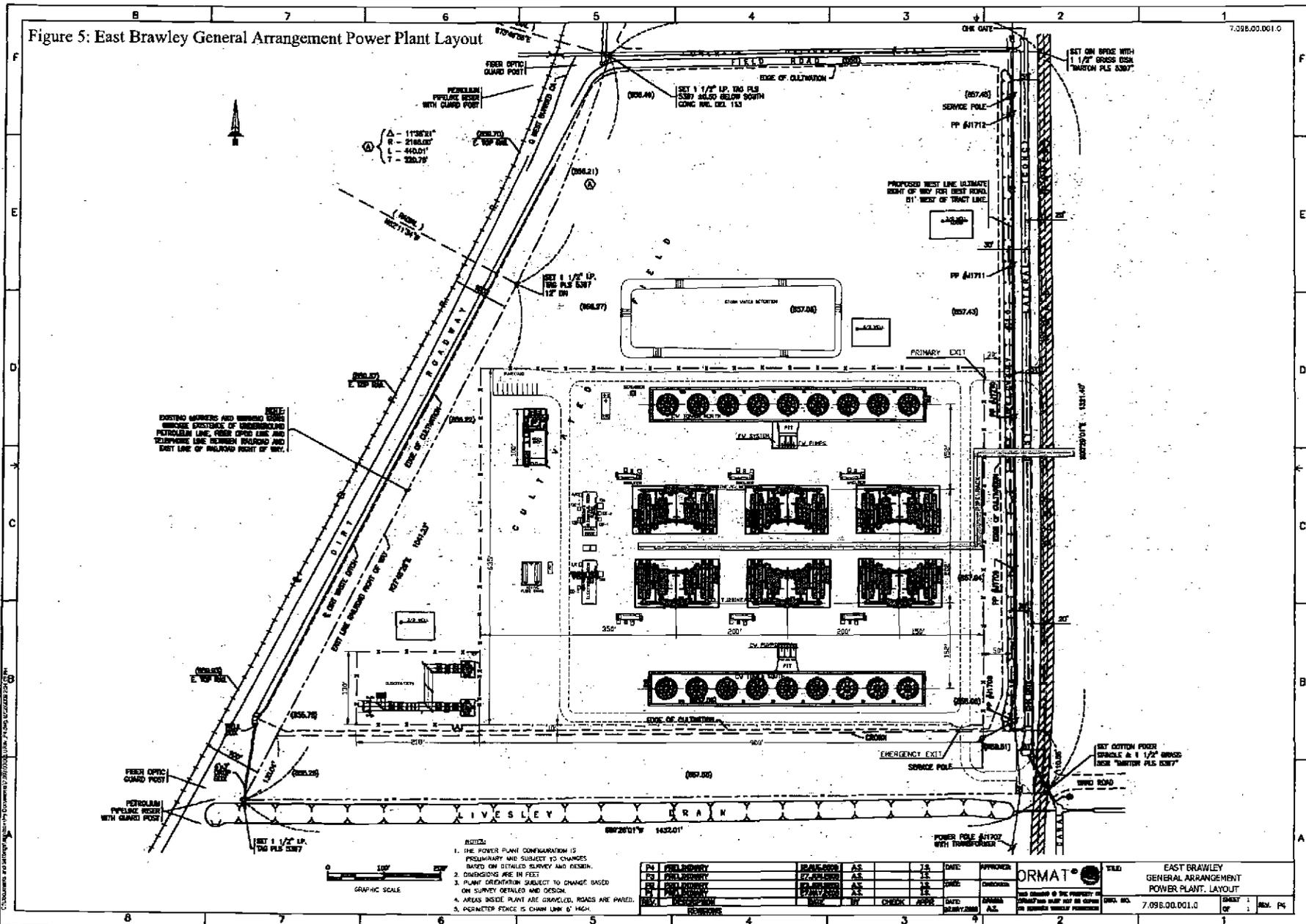


Figure 5: East Brawley General Arrangement Power Plant Layout



EXISTING MARKERS AND SURROUNDING TERRACE EXISTENCE OF UNDERGROUND PETROLEUM LINE, FIELD OPTIC LINE AND TELEPHONE LINE BETWEEN TRAINING AND EXIST LINE OF PAVED POINT OF ENTRY.

- NOTES:
1. THE POWER PLANT CONFIGURATION IS PRELIMINARY AND SUBJECT TO CHANGES BASED ON DETAILED SURVEY AND DESIGN.
 2. DIMENSIONS ARE IN FEET.
 3. PLANT ORIENTATION SUBJECT TO CHANGE BASED ON SURVEY DETAILED AND DESIGN.
 4. AREAS INSIDE PLANT ARE GRAVELED, ROADS ARE PAVED.
 5. PERIMETER FENCE IS CHAIN LINK 6' HIGH.



NO.	DESCRIPTION	DATE	BY	CHECK	APPROVED
P4	PRELIMINARY	07/20/01	AS	JS	DATE
P5	PRELIMINARY	07/20/01	AS	JS	DATE
P6	PRELIMINARY	07/20/01	AS	JS	DATE
P7	PRELIMINARY	07/20/01	AS	JS	DATE
P8	PRELIMINARY	07/20/01	AS	JS	DATE
P9	PRELIMINARY	07/20/01	AS	JS	DATE
P10	PRELIMINARY	07/20/01	AS	JS	DATE
P11	PRELIMINARY	07/20/01	AS	JS	DATE
P12	PRELIMINARY	07/20/01	AS	JS	DATE
P13	PRELIMINARY	07/20/01	AS	JS	DATE
P14	PRELIMINARY	07/20/01	AS	JS	DATE
P15	PRELIMINARY	07/20/01	AS	JS	DATE
P16	PRELIMINARY	07/20/01	AS	JS	DATE
P17	PRELIMINARY	07/20/01	AS	JS	DATE
P18	PRELIMINARY	07/20/01	AS	JS	DATE
P19	PRELIMINARY	07/20/01	AS	JS	DATE
P20	PRELIMINARY	07/20/01	AS	JS	DATE
P21	PRELIMINARY	07/20/01	AS	JS	DATE
P22	PRELIMINARY	07/20/01	AS	JS	DATE
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P31	PRELIMINARY	07/20/01	AS	JS	DATE
P32	PRELIMINARY	07/20/01	AS	JS	DATE
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P45	PRELIMINARY	07/20/01	AS	JS	DATE
P46	PRELIMINARY	07/20/01	AS	JS	DATE
P47	PRELIMINARY	07/20/01	AS	JS	DATE
P48	PRELIMINARY	07/20/01	AS	JS	DATE
P49	PRELIMINARY	07/20/01	AS	JS	DATE
P50	PRELIMINARY	07/20/01	AS	JS	DATE

ORMAT
 EAST BRAWLEY GENERAL ARRANGEMENT POWER PLANT LAYOUT
 SHEET NO. 7.095.00.D01.0
 OF 1 REV. P4

Service Area Description

The Project area is located in Imperial County, which is located in the southeastern corner of California and comprised of approximately 4,597 square miles or 2,942,080 acres.² (Figure 1) Imperial County is bordered by San Diego County to the west, Riverside County to the north, the Colorado River/Arizona boundary to the east, and 84 miles of International Boundary with the Republic of Mexico to the south. Specifically within Imperial County, EBGDP is proposed northeast of the City of Brawley. (Figure 2)

Approximately fifty percent of land in Imperial County is undeveloped and under federal ownership and jurisdiction. One-fifth of the nearly 3 million acres in Imperial County is irrigated for agricultural purposes; most notable being the central area known as Imperial Valley. The Imperial Valley area is the south-central part of Imperial County, and is bounded by Mexico on the south, the Algodones Sand Hills on the east, the Salton Sea on the north, San Diego County on the northwest, and the alluvial fans bordering the Coyote Mountains and the Yuha Desert to the southwest. The Imperial Valley Area encompasses a total of 989,450 acres.³ Imperial Valley land that is irrigated for agriculture consists of 512,163 acres.⁴ The developed area, which includes Imperial County's incorporated cities, unincorporated communities and supporting facilities, comprises approximately one percent of Imperial County's area. The Salton Sea accounts for approximately seven percent of Imperial County's surface area.

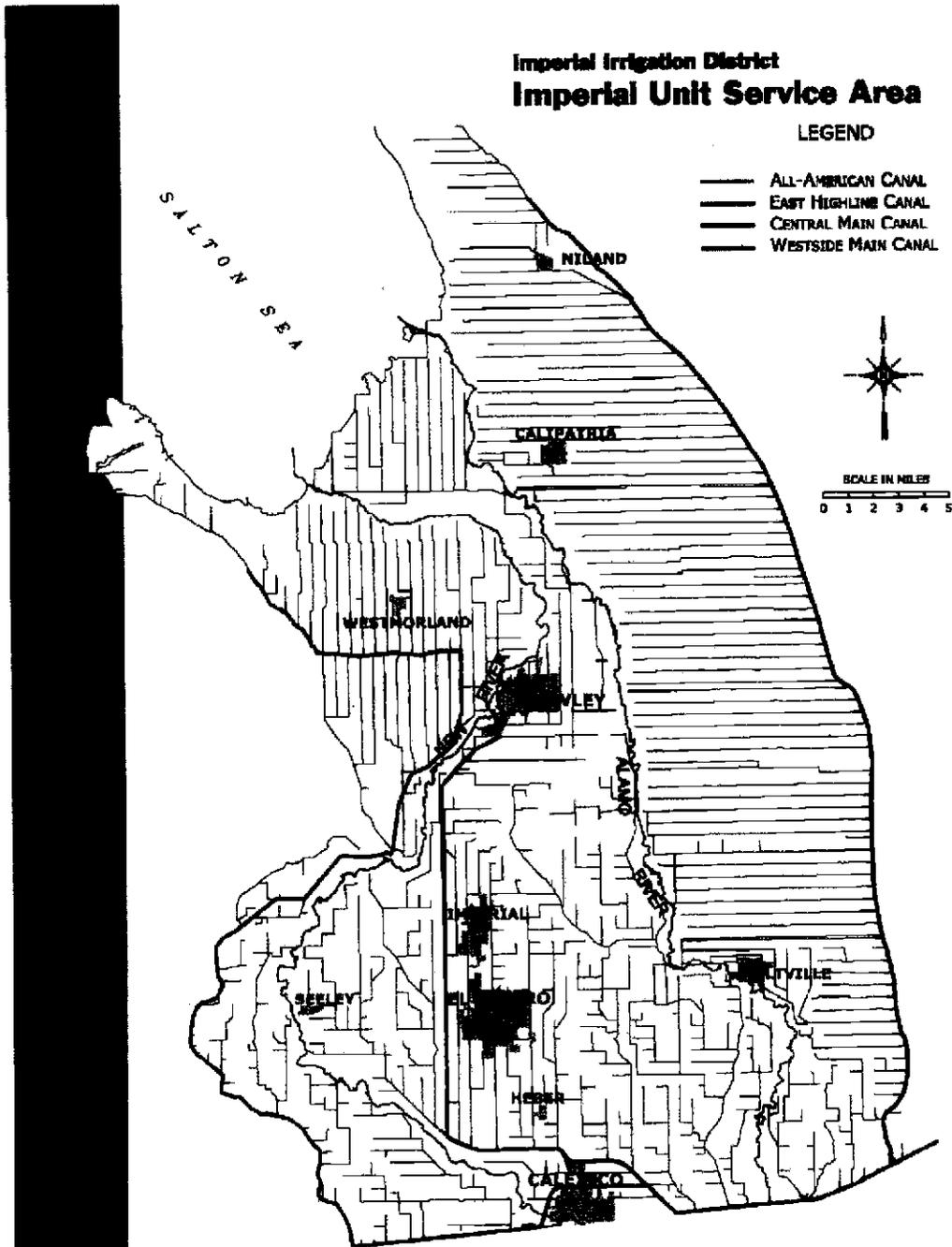
IID has a specific area that it is responsible for supplying water to, which is referred to as the Imperial Unit in this document. In addition to agricultural irrigation, the Imperial Unit includes the seven incorporated cities of Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial and Westmorland. The three unincorporated communities in the Imperial Unit are Heber, Niland and Seeley. See Figure 6 for a map of the Imperial Unit.

² Imperial County area was taken from the Imperial County General Plan 2003 Update, Land Use Element, Page 27.

³ Imperial Valley area was taken from the U.S. Department of Agriculture Soil Conservation Service: Soil Survey of Imperial County California Imperial Valley Area, Page 1.

⁴ Imperial County irrigated agriculture area was taken from the Imperial County General Plan 2003 Update, Land Use Element, Page 27.

Figure 6: Imperial Unit Boundary



Source: IID 2005 Annual Water Report, page 1

Imperial Unit Land Uses⁵

IID is a community-owned utility that provides irrigation water and electric power to the lower southeastern portion of California's desert. In April 1998, IID and San Diego County Water Authority signed a historic water transfer agreement, a cornerstone in California's 4.4 Plan to meet future water needs. Established in 1911 under the California Irrigation District Act, IID is governed by a five-member board of directors elected by the public. Board meetings are held twice a month at the district's El Centro division office. The organization is divided into eight functional areas: Executive Offices, Water Department, Power Department, Finance & Treasury, Human Resources, Public Affairs, Information Systems and General Services.

The source of virtually all surface waters in Imperial County is the Colorado River. Water is diverted from the Colorado River at the Palo Verde Weir, north of Blythe by Palo Verde Irrigation District, and at the Imperial Dam through the All-American Canal headworks and desilting basins by Imperial Irrigation District and Bard Irrigation District into the All-American Canal for use in the Bard, Imperial and Coachella Valleys. The district's entitlement of Colorado River water consists of 3.1 million acre-feet per year.

IID's open channel gravity flow irrigation and drainage system services over 500,000 acres of irrigated farmland. The system includes 80 miles of the All-American Canal, 52 miles of drains in the All-American Canal Section, 3 miles of the New Briar Canal and 1,620 miles of other main and lateral canals. A favorable salt balance has been maintained in Imperial Valley soils as approximately 30% more salt was discharged through the district's drainage than was brought into Imperial Valley by importation of Colorado River water for irrigation. This balance is due to the installation of 28,972 miles of underground drain tile in individual fields since 1929. This saline water is then carried through the district's drainage canals into the Salton Sea. Adequate drainage in the Imperial Valley makes the difference between barren land and highly productive soil. As of 2005, there were 1,668 miles of IID canals, which include the All American Canal, mains and laterals. Also as of 2005, there were 1,456 miles of IID drains. The number of pipe lined canals is increasing for projects within or adjacent to urban areas due to real estate development that is occurring in the Imperial Valley.

Agricultural development in the Imperial Valley began at the turn of the twentieth century, and now supports approximately \$1,286,066,000 annually in the local agriculture economy. IID delivers Colorado River water to all agricultural land and urban water retailers within its contracted water service area. While the agriculture-based economy is expected to continue, land use will vary somewhat over the years as urbanization and growth occur in rural areas adjacent to existing urban areas.

⁵ Specific information in this section is from the Imperial Irrigation District 2005 Annual Water Report.

Imperial Unit Future Land Uses

The economy within the Imperial Unit is gradually becoming more diverse. Agriculture will likely continue to be the primary industry within the Imperial Unit; however, two principal factors that will cause a decrease or reduction of crop acreage within the Imperial Unit will be urban development and the economics of the agricultural market. Over the next twenty years, urbanization is expected to slightly decrease agriculture land use in order to provide adequate space for an increase in residential, commercial and industrial growth.

The majority of urban development should occur in and around the seven incorporated cities and three unincorporated communities. Urban development is expected to remain concentrated near the established urban centers for a more efficient infrastructure layout. Part of this urban growth is due to the two international border crossings in the Imperial Unit, the Calexico Port of Entry and the International Port of Entry. The Mexican/United States International Port of Entry is located just east of the City of Calexico. It is expected to facilitate urban development within the Imperial Unit, since the movement of goods and services has increased dramatically due to the creation of the North American Free Trade Agreement (NAFTA).

Typical undeveloped areas that are being developed or could likely be developed include areas that surround the incorporated cities and unincorporated communities of Imperial County, as well as unincorporated areas that are defined by specific plans. Specific plans are used to implement the Imperial County General Plan for large development projects such as planned communities, or to designate an area of Imperial County where further studies are needed for development like Mesquite Lake. When adopted, a specific plan serves as an amendment to Imperial County's General Plan for a very defined and detailed area.

In 2003, the total urban area within the Imperial Unit was 49,760 acres or 4.69% of the total Imperial Unit, which is comprised of 1,061,637 acres.⁶ This percentage is likely higher due to real estate development that has occurred between 2003 and 2008. Urban areas yet to be developed will be characterized by a full level of urban services, and will contain a broad range of residential, commercial and industrial land uses. It is anticipated that most urban developments yet to be developed will eventually be annexed and incorporated into existing municipal areas, or form new County Service Areas (CSAs), and be provided with a full range of public infrastructure normally associated with urbanized areas. This includes public sewer and water, drainage improvements, street lights, fire hydrants, and fully improved paved streets with curbs, gutters and sidewalks that are consistent with respective municipal standards.

⁶ Total acreage for urban areas within the Imperial Unit was calculated based on information that was available in the Land Use Element of the Imperial County General Plan 2003 Update, pages 7, 8 & 10. Imperial Unit area is from the Imperial Irrigation District 2005 Annual Water Report, page 29.

Climate Factors

Imperial County has an arid desert climate characterized by hot/dry summers and mild winters. Summer temperatures typically exceed 100 degrees Fahrenheit, while winter low temperatures rarely drop below 32 degrees Fahrenheit. The remainder of the year has a relatively mild climate with temperatures averaging in the mid-70's. The average annual air temperature is 72 degrees Fahrenheit, and the average frost-free season is about 300 days per year. The average annual rainfall in the Imperial Valley is less than three inches, with most rainfall associated with brief, but intense storms. The majority of the rainfall occurs from November through March, although periodic summer thunderstorms are common in the region.

The following information on elevations was taken from the Soil Survey of Imperial County, California, Imperial Valley Area:

“Elevation ranges from 230 feet below sea level to about 350 feet above... The physiography of the Imperial Valley is that of a great basin. It is part of the northern extension of the giant geologic trough occupied by the Gulf of California. The portion of the basin within the survey area is bounded on the east by the Chocolate and Cargo Muchacho Mountains and on the west by the Coyote and Fish Creek Mountains. The Imperial Valley is separated from the Gulf of California by the ridge of the Colorado River delta, which is about 30 feet above sea level at its lowest point. The lowest part of the basin is the bed of the prehistoric Lake Cahuilla, where the beach line is about 35 feet above sea level. The deepest part of the lakebed, now filled by the Salton Sea, is about 270 feet below sea level. The shoreline of the Salton Sea was about 230 feet below sea level in 1974.”⁷

⁷ U.S. Department of Agriculture Soil Conservation Service: Soil Survey of Imperial County California Imperial Valley Area, Page 1.

Projected Population

The following was taken directly from the Imperial County General Plan Land Use Element with regard to population:

“Imperial County Planning/Building Department bases its population estimates on building permits and housing unit change. From this annual compilation, the Population Research Unit of the California Department of Finance (DOF) estimates the annual change in population. According to these 2003 estimates, the population estimate for the unincorporated area is 33,750 with the total population estimate for Imperial County being 150,900. This compares to the 1990 census results of 32,773 for the unincorporated area and 147,361 for the entire County.

The seven incorporated cities: Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmorland, account for 75 percent of the total population. In the past, incorporated cities have grown at a faster pace than the rural areas. Recently, residential development has increased in agricultural areas away from cities and communities. This has created conflicts with agriculture, in spite of the County’s “Right to Farm” ordinance. Also, treated water is generally not available in these areas and the U.S. Environmental Protection Agency has, by Administrative Order of December 22, 1992, prohibited Imperial Irrigation District from providing service to these residences from untreated canal water. Attempts to resolve this situation, including installation of in-home treatment systems, are on going.”⁸

Table 1 provides information that was specified in the Imperial County General Plan Land Use Element with regard to County population levels in 1992 and 2003. The population levels given in the General Plan were used to calculate an estimated population for 2028. The methods of calculation for the 2028 population in each Area of Interest are as follows:

2028 Unincorporated Areas:

2003 population - 1992 population = difference

2028 Incorporated Areas:

2003 population - 1992 population = difference
117,150 people - 88,595 people = 28,555 people
28,555 people ÷ (2003 - 1992) = 2,596 people / year
2,596 people / year * (2028 - 2003) = 64,900 people
117,150 people + 64,900 people = **182,050 people**

2028 Entire County:

2003 population - 1992 population = difference
150,900 people - 117,421 people = 33,479 people
33,479 people ÷ (2003 - 1992) = 3,044 people / year
3,044 people / year * (2028 - 2003) = 76,100 people
150,900 people + 76,100 people = **227,000 people**

Imperial County Population Projections			
Area of Interest	1992	2003	2028*
Unincorporated Areas	28,826	33,750	44,950
Incorporated Areas	88,595	117,150	182,050
Entire County	117,421	150,900	227,000

*2028 population estimates were calculated separately for each Area of Interest using the same manner of calculation.

The Imperial County population is closely tied with job and employment availability, which typically results in sharp population increases during winter months. This is because agriculture is the dominant industry in Imperial County, which follows a seasonal pattern of high employment during winter months followed by lower employment during hot summer months, exactly opposite from the seasonal pattern elsewhere in California. As a leading producer of row crops and livestock, Imperial County is experiencing a trend toward reliance on labor contractors to provide workers during the high seasonal demand. As a result, population will increase more predominantly in winter months than summer months.

⁹ Information for 1992 and 2003 is from the Imperial County General Plan 2003 Update, Land Use Element, page 26.

Historic Origins of Imperial Irrigation District's Water Rights

The Imperial Unit depends solely on the Colorado River for surface water inflows. The Imperial Irrigation District imports raw Colorado River water and distributes it primarily for agricultural purposes. IID also delivers untreated flows for municipal and industrial uses. Municipal and/or industrial users treat raw water to meet state and federal drinking water guidelines before distribution to urban users. Rainfall is less than three inches per year and does not contribute to Imperial Irrigation District's water supply, although at times it may reduce agricultural water demand. The groundwater in the Imperial Unit is of poor quality and is generally unsuitable for domestic or irrigation purposes.

"The Imperial Irrigation District (IID) was formed in 1911, under the California Irrigation District Act, to acquire properties of the bankrupt California Development Company and its Mexican subsidiary to import raw Colorado River water and distribute it. By 1922, IID had acquired 13 mutual water companies, which had developed and operated distribution canals in the Imperial Valley. By the mid-1920s, IID was delivering water to nearly 500,000 acres. Since 1942, water has been diverted at Imperial Dam on the Colorado River into the All-American Canal (AAC), both of which IID operates and maintains. IID ended its fifty-year operation in Mexico by selling its holdings to the Mexican government in 1961."¹⁰

Water Rights¹¹

IID rights to divert Colorado River water are longstanding, and IID holds legal titles to all its water and water rights in trust for landowners within the district (California Water Code 20529 and 22437; *Bryand v. Yellen*, 447 U.S. 352, 371 (1980), fn.23.). Beginning in 1885, a number of individuals, as well as the California Development Company, made a series of appropriations of Colorado River water under California law for use in the Imperial Valley.

Colorado River water rights are governed by numerous compacts, state and federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the "Law of the River." Together, these documents allocate the water, regulate land use and manage the Colorado River water supply among the seven basin states and Mexico. Of all regulatory literature that governs Colorado River water rights, the following are the specifics that impact IID:

- Colorado River Compact (1921)
- Boulder Canyon Project Act (1928)
- California Seven-Party Agreement (1931)
- Arizona v. California US Supreme Court Decision (1964, 1979)

¹⁰ Imperial Irrigation District 2005 Annual Water Report, page 10.

¹¹ Information in this sub-section is from the Imperial Irrigation District 2005 Annual Water Report, pages 15-18.

- Colorado River Basin Project Act (1968)
- Quantification Settlement Agreement (2003)

Colorado River Compact (1921)

With the authorization of their legislatures and at the urging of the federal government, representatives from the seven Colorado River basin states began negotiations regarding the distribution of water from the Colorado River in 1921. In November of 1922, an interstate agreement called the "Colorado River Compact" was signed by the representatives giving each basin perpetual rights to annual apportionments of 7.5 million acre-feet (MAF) of Colorado River water.

Boulder Canyon Project Act (1928)

Provisions in the 1928 Boulder Canyon Project Act made the compact effective and authorized construction of Hoover Dam and the All-American Canal, and served as the United States' consent to accept the Compact. Through a Presidential Proclamation on June 25, 1929, this act resulted in ratification of the Compact by six of the basin states and required California to limit its annual consumptive use to 4.4 MAF of the lower basin's apportionment plus not less than half of any excess or surplus water unapportioned by the Compact. A lawsuit was filed by the State of Arizona after its refusal to sign. Through the implementation of its 1929 Limitation Act, California abided by this federal mandate. The Boulder Canyon Act authorized the Secretary to "contract for the storage of water... and for the delivery thereof... for irrigation and domestic uses," and additionally defined the lower basin's 7.5 MAF apportionment split, with an annual allocation 0.3 MAF to Nevada and 2.8 MAF to Arizona. Even though the three states never formally settled or agreed to these terms, a 1964 Supreme Court decision (*Arizona v. California*, 373 U.S. 546) declared the three states' consent to be insignificant since the Boulder Canyon Project Act was authorized by the Secretary.

California Seven-Party Agreement (1931)

After implementation of the Boulder Canyon Project Act, the Secretary requested that California create recommendations regarding distribution of its allocation of Colorado River water. Under direction of the State Engineer, the California Seven-Party Agreement was developed and authorized by the affected parties to prioritize the State's water rights in August of 1931. In September of 1931, the Secretary accepted this agreement and established these priorities through general regulations. Priority allocations (1-4) account of California's annual apportionment of 4.4 MAF, with agricultural entities using 3.85 MAF from that total. Priorities (5-7) are defined for years in which the Secretary proclaims that excess waters are available.

Arizona v. California US Supreme Court Decision (1964, 1979)

The Supreme Court issued a decision settling a 25-year-old disagreement between Arizona and California in 1963, which stemmed from Arizona's desire to build the Central Arizona Project to enable use of its full apportionment. California's argument was that as Arizona used water from the Gila River, a Colorado River tributary, it was using a portion of its annual Colorado River apportionment. An additional argument from California was that it had developed a historical use of some of Arizona's apportionment, which, under the doctrine of prior appropriation, precluded Arizona from developing the project.

California's arguments were rejected by the Supreme Court. Under direction of the Supreme Court, the Secretary was restricted from delivering water outside of the framework of apportionments defined by law. Preparation of annual reports documenting consumptive use of water in the three lower basin states was also mandated by the Supreme Court. In 1979, present perfected water rights (PPRs) referred to in the Colorado River Compact and in the Boulder Canyon Project Act were addressed by the Supreme Court in the form of a Supplemental Decree.

In March of 2006, a Consolidated Decree was issued by the Supreme Court to provide a single reference to the conditions of the original 1964 decrees and several additional decrees in 1966, 1979, 1984 and 2000 that stemmed from the original ruling. The Consolidated Decree also reflects the settlements of the federal reserved water rights claim for the Fort Yuma Indian Reservation.

Colorado River Basin Project Act (1968)

In 1968, various water development projects in both the upper and lower basins, including the Central Arizona Project (CAP) were authorized by Congress. Under the act, priority was given to California's apportionment before the CAP water supply in times of shortage. Also under the act, the Secretary was directed to prepare long-range criteria for the Colorado River reservoir system in consultation with the Colorado River Basin states.

Quantification Settlement Agreement (2003)

Due to completion of a large portion of the CAP infrastructure in 1994, creation of the Arizona Water Banking Authority in 1965, and the growth of Las Vegas in the 1990s, California encountered increasing pressure to live within its rights under the Law of the River. After years of negotiating among Colorado River Compact States and affected California water delivery agencies, a Quantification Settlement Agreement (QSA) and related agreements and documents were signed by the Secretary of Interior, IID, Coachella Valley Water District (CVWD), MWD, and SDCWA and other affected parties on October 10, 2003.

California's 3a apportionment for a period of 35 to 75 years between IID and CVWD, with provisions for transfer of supplies involving IID, CVWD, MWD and SDCWA are quantified in the QSA. Allocations for consumptive use of Colorado River water by IID, CVWD and MWD that will enable California to stay within its basic annual apportionment (4.4 MAF plus not less than half of any declared surplus) are defined by the terms of the QSA. See Tables 2 and 3.

User	Annual Apportionment (AF)
Palo Verde Irrigation District and Yuma Project	420,000
Imperial Irrigation District	3,100,000
Coachella Valley Water District	330,000
Metropolitan Water District	550,000
Total	4,400,000

Source: Imperial Irrigation District 2005 Annual Water Report, page 18.

Table 3: California Colorado River Annual Water Right Priorities			
Priority	User	Apportionment	Present Perfected Rights
1.	Palo Verde Irrigation District (for use exclusively upon 104,500 acres of Valley land in and adjoining district)	3,850,000 AF	219,791 AF* (or the consumptive use of 33,604 acres)
2.	Yuma Project (for use on California Division, not exceeding 25,000 acres of land)		38,270 AF (or the consumptive use of 6,294 acres)
3a.	Imperial Irrigation District (lands served by All-American Canal in Imperial and Coachella Valleys)		2,600,000 AF (Imperial Irrigation District only)(or the consumptive use of 424,145 acres)
3b.	Palo Verde Irrigation District (for use exclusively on an additional 16,000 acres of mesa lands)		
4.	Metropolitan Water District (for use on the Southern California Coastal Plain)	550,000 AF	
	Subtotal: California's Limit (not including surplus waters) of Colorado River Water as per the Boulder Canyon Project Act and the 1929 Limitation Act	4,400,000 AF	
5a.	Metropolitan Water District (for use on the Southern California Coastal Plain)	550,000 AF	
5b.	City and County of San Diego (through MWD)	112,000 AF	
6a.	Imperial Irrigation District (lands served by the All-American Canal in Imperial and Coachella Valleys)	300,000 AF	
6b.	Palo Verde Irrigation District (for use exclusively on an additional 16,000 acres of mesa lands)	N/A	
7.	California Agricultural Use (Colorado River Basin lands in California)	All remaining available water	

Source: Imperial Irrigation District 2005 Annual Water Report, page 16.

* An acre-foot (AF) is approximately 325,851 gallons.

Water Supply Sources¹²

Groundwater in the Imperial Unit is of poor quality and is unsuitable for domestic or irrigation use. Total dissolved solids (TDS) range from hundreds to more than 10,000 milligrams per liter (mg/l). Generally, the groundwater's fluoride concentration is higher than recommended for drinking water, while its boron concentration exceeds that recommended for certain agricultural crops.

Surface water is dependent on the inflow of irrigation water from the Colorado River, and is non-potable without treatment. There are three general categories of surface water in the Imperial Unit: freshwater, brackish water, and saline water. The freshwater (with TDS generally less than 1,000 ppm) includes all Colorado River inflows delivered by the All American Canal and other canals and laterals within IID's Service Area. Brackish water (with TDS in the range of 1,000 to 4,000 ppm) can be found within the Alamo River, New River, and the agricultural drains that discharge into these rivers or directly to the Salton Sea. The Alamo River derives nearly all of its flow from the irrigation water return flows (tailwater and tile water) in the Imperial Unit. The New River derives roughly 65 percent of its volume from irrigation water return flows from the Imperial Unit, with the remaining 35 percent derived from drainage that flows from the Mexicali Valley across the International Border. Saline water (with TDS above 4,000 ppm) makes up the Salton Sea, as its salinity is approximately 44,000 ppm.¹³

IID serves as the regional water supplier by importing raw Colorado River water and delivering it to agricultural, municipal and industrial water users within its service area. The Imperial Dam is located 20 miles northeast of Yuma Arizona, and serves as IID's point of diversion from the Colorado River to the All American Canal. The All American Canal is an 82-mile long gravity flow canal that services the Imperial Valley via three main canals: East Highline, Central Main, and Westside Main. Through 1,668 miles of canals and laterals IID is able to deliver water throughout the Imperial Unit.

¹² Specific information in this section is from Imperial Irrigation District 2005 Annual Water Report, with the exception of the information about saline water as it relates to the Salton Sea.

¹³ The salinity of the Salton Sea is from Salton Sea Salinity and Saline Water.

Project Water Service and IID System Conservation Options

Project Water Service

Best Canal abuts the parcel where the power plant is proposed and currently services the parcel via Gate 110. Due to real estate development that has occurred south of the City of Brawley, IID has determined that there would not be adequate capacity in the Best Canal to service the EBGDP. Alternatively, Ormat seeks to utilize the Rockwood Canal for raw water service to operate the EBGDP. In order to do so, a pipeline from Rockwood Canal Gate 131 to the proposed power plant would be constructed.

IID System Conservation

Relative to the delivery history for the area that would be taken out of agricultural production as a result of the EBGDP, and the annual water usage for the area that would be taken out of agricultural production as a result of the EBGDP based on a consumption rate of 5.13 acre-feet per acre per year, Ormat proposes to use a substantial amount of water annually at build-out. Ormat project engineers and management staff have estimated that the EBGDP would use 5,500 acre-feet of raw water annually for operations; which is significantly more than that site currently uses for agricultural operations. This would impact IID's distribution system and apportionment; therefore, the following conservation options are recommended for consideration, collectively or individually, in order to provide Ormat ample water for operation of the EBGDP:

Conservation Option (1):

If IID was to declare a supply demand imbalance for any year(s) during the life of the proposed EBGDP, Ormat may be required in one way or another to help with water conservation within IID's distribution system. One method is for IID to allow Ormat to acquire and fallow farmland within the Imperial Unit. If this conservation option is deemed appropriate, the acreage of land for acquisition and fallowing could be calculated at a later date by means of a method similar to the following:

- IID determines how many acre-feet of water Ormat should help conserve;
- IID looks at the average annual water delivery history for agricultural parcels that may be potentially fallowed;
- After looking at the average annual delivery histories of agricultural parcels that could be fallowed, IID calculates how many acres of land must be acquired and fallowed to equal the amount of acre-feet of water Ormat should help conserve

Conservation Option (2):

If IID was to declare a supply demand imbalance for any year(s) during the life of the proposed EBGDP, Ormat may be required in one way or another to help with water conservation within IID's distribution system. One method is for IID to allow Ormat to partake in the District Water Exchange. This would entail IID modifying their updated Regulations for Equitable Distribution so that Non-Agricultural Water Users could partake in the District Water Exchange. If this conservation option is deemed appropriate, the amount of water for Ormat to purchase could be calculated at a later date by means of a method similar to the following:

- IID determines how many acre-feet of water Ormat should purchase;
- IID finds eligible sellers for Ormat to purchase water from

Conservation Option (3):

If IID was to declare a supply demand imbalance for any year(s) during the life of the proposed EBGDP, Ormat may be required in one way or another to help with water conservation within IID's distribution system. One method is for IID to allow Ormat to import water from a source other than IID's Colorado River entitlement brought into the IID conveyance system to satisfy all or a portion of the EBGDP's maximum use amount. This would be similar to the agreement between Ormat and IID regarding the North Brawley Geothermal Development Project (NBGDP).

Conservation Option (4):

If IID was to declare a supply demand imbalance for any year(s) during the life of the proposed EBGDP, Ormat may be required in one way or another to help with water conservation within IID's distribution system. One method is for Ormat to utilize an alternative water source such as treated wastewater, groundwater, etc., which could be utilized independently or in conjunction with IID water to operate the EBGDP.

Imperial Irrigation District Water Use and Demand

Demand for water in the Imperial Unit service area is divided into three basic categories: agricultural, municipal, and industrial. In 2007, the IID delivered 2,646,072 acre-feet of water to the Imperial Unit. 2,593,541 acre-feet or 98.01 percent of IID's flows in 2007 were to agricultural users.¹⁴ The seven incorporated and three unincorporated urban areas within the Imperial Unit each divert water from IID's canal system to their treatment facilities prior to individual water user distribution within their respective municipal areas. The primary industrial water users outside the urban areas are geothermal plants, Holly Sugar Corporation, chemical and fertilizer producers, a state prison, and a U.S. Naval Air Facility.

IID is a raw water retailer and a domestic raw water wholesaler, and does not supply potable drinking water. In addition to supplying large agricultural operations with raw water, IID provides raw water to small acreage and service pipe connections, some of which are rural homes without an alternative water source. In these instances, IID has complied with state and federal Safe Drinking Water Acts (SDWA) through an exclusionary process unique to irrigation districts. IID ensures that all rural water users (with indoor uses of canal water) also have a source of water delivered to their property for cooking and drinking purposes from a California Department of Health Services Approved Provider.

IID's consumptive use values include the total use of raw water in the Imperial Unit. These consumptive use values include agriculture, small acreage, service pipes, municipalities, industrial, losses and unaccounted-for raw water. There is no available data that completely distinguishes between these uses of raw water. Water distribution systems lose water during distribution for several reasons. Specific water distribution losses depend on the type of distribution system. A piped water distribution system can lose water due to pipe failures or leaks. Open channels, ponds, reservoirs, and water basins can lose water from seepage through the soil, surface evaporation into the air, and plant consumption. IID has an open channel gravity flow water distribution system. Its water distribution system losses result from three major conditions: seepage, operational discharges, and evaporation.

¹⁴ Total and agricultural delivery quantities for 2007 were the most recent water distribution sums available from the IID, and were taken from the Imperial Irrigation District 2007 Annual Report, pg. 20.

Section 1: Water Availability during a Normal Year

The 2003 Quantification Settlement Agreement grants IID an annual apportionment of 3,100,000 acre-feet. (Table 3) According to the IID 2005 Annual Water Report, as well as the 2006 and 2007 Annual Reports, IID has been delivering less water than its annual apportionment, which results in a surplus of water supplies. Table 4 outlines the annual water delivery for the years 2001 to 2007 and gives the surplus associated with each year. No information was available after 2007.

Quantity	2001	2002	2003	2004	2005	2006	2007
Appt**	3,100,000	3,100,000	3,100,000	3,100,000	3,100,000	3,100,000	3,100,000
Usage ¹⁵	2,842,119	2,874,874	2,660,741	2,494,415	2,519,078	2,624,717	2,646,072
Surplus	257,881	225,126	439,259	605,585	580,922	475,283	453,928

* All values are in acre-feet

** Appt : Apportionment

¹⁵ IID water usage is from the Imperial Irrigation District 2005 Annual Water Report, pg. 32; the Imperial Irrigation District 2006 Annual Water Report, pg. 14; and the Imperial Irrigation District 2005 Annual Water Report, pg. 20.

Section 2: Expected Water Availability during Multiple Dry Years

In an effort to prepare this Water Supply Assessment in compliance with SB 610 by addressing water availability during a single dry year, and multiple dry years, the Compilation of Records in Accordance with Article V of the Supreme Court of the United States in Arizona v. California Dated March 9, 1964 Calendar Years 1964 - 2007 has been referenced.

IID's historical consumptive use of Colorado River water was useful in determining the single and multiple dry years of the Imperial Valley. For the purpose of this analysis, the "single dry year" term is changed to "single reduced demand year". Similar, the "multiple dry years" term is changed to "multiple reduced demand years". After reviewing IID's annual consumptive use from 1964 through 2007, it was apparent that 1983 had the lowest annual demand, which was 2,555,617 acre-feet. The three consistent years having the lowest demands from 1964 to 2007 were 1982, 1983 and 1984. Their demands were 2,595,578, 2,555,617, and 2,666,535 acre-feet respectively. See Table 5.

	Single Reduced Demand Year (1983)	Multiple Reduced Demand Years		
		Year 1 (1982)	Year 2 (1983)	Year 3 (1984)
IID Supply*	3,100,000	3,100,000	3,100,000	3,100,000
IID Demand**	2,555,617	2,595,578	2,555,617	2,666,535
Difference	544,383	504,422	544,383	433,465

* Water supply for the above mentioned years is assumed to be equivalent to IID's existing annual apportionment.

** Water demand for the above mentioned years is from the Compilation of Records in Accordance with Article V of the Supreme Court of the United States in Arizona v. California Dated March 9, 1964 Calendar Years 1964 - 2007, by the U.S. Department of the Interior Bureau of Reclamation Lower Colorado Region.

Management during Supply Demand Imbalance via Equitable Distribution Plan¹⁶

On November 28, 2006, the Board of Directors ("IID Board") of the Imperial Irrigation District ("District") adopted Resolution No 22-2006 approving the development and implementation of an Equitable Distribution Plan. As part of this Resolution, the IID Board directed the General Manager to prepare the rules and regulations necessary or appropriate to implement the Equitable Distribution Plan within the District. Pursuant to Resolution No. 22-2006, the IID Board also approved a Final Negative Declaration ("Negative Declaration") prepared for the Equitable Distribution Plan. The Negative Declaration was attached to the Resolution as Attachment A. As set forth in Resolution

¹⁶ Information under this section regarding the Equitable Distribution Plan is from the Imperial Irrigation District Environmental Compliance Report for Revised Regulations for Equitable Distribution Plan, pg 1.

No. 22-2006, the IID Board determined that: (1) the Negative Declaration provided a sufficient assessment of the environmental impacts of the Equitable Distribution Plan pursuant to the California Environmental Quality Act ("CEQA"), and (2) there was no substantial evidence that the Equitable Distribution Plan will have a significant effect on the environment.

On December 18, 2007, the IID Board adopted Resolution No. 31-2007 approving "Regulations for Equitable Distribution Plan" ("ED Regulations"). Pursuant to Resolution No. 31-2007, the IID Board approved an Environmental Compliance Report prepared for the ED Regulations which was attached to the Resolution as Attachment B. The IID Board resolved that: (1) based upon the Environmental Compliance Report for the ED Regulations, which concluded that the environmental impacts of the ED Regulations were sufficiently assessed pursuant to the Negative Declaration adopted by the IID Board for the Equitable Distribution Plan on November 28, 2006, no environmental assessment was required pursuant to CEQA and CEQA Guidelines; and (2) the conclusions of the Environmental Compliance Report were approved and adopted by the IID Board.

The District has determined that certain revisions to the ED Regulations are desirable to simplify and clarify the administration of the Equitable Distribution Plan. Accordingly, "Revised Regulations for Equitable Distribution Plan" have been prepared by the Imperial Irrigation District.

Resolution No. 22-2008: Regulations for Equitable Distribution Plan¹⁷

Purpose

The Imperial Irrigation District ("District") is authorized by State law to adopt rules and regulations for the equitable distribution of water within the District. The District Board has approved a plan for the equitable apportionment of water (the "Equitable Distribution Plan") in the event that in any water year, the expected demand for water is likely to exceed the supply expected to be available to the District (supply/demand imbalance or "SDI" condition). Pursuant to Resolution No. 21-2008, the Board of Directors has adopted the following Regulations establishing the rules and procedures for the Equitable Distribution Plan.

Terms and Definitions

Agricultural Water: Water used for irrigation and related agricultural purposes, fish farming, and algae farming.

Agricultural Water User: A District Water User that uses Agricultural Water.

¹⁷ Information under this section regarding the Equitable Distribution Plan is from the Imperial Irrigation District Revised Regulations for Equitable Distribution Plan, pgs. 1-7.

Available Water Supply: Colorado River Water available to the District minus District system losses and efficiency conservation and minus 11,500 AF for miscellaneous Present Perfected Rights.

Conserved Water Rate: The rate specified in the District's Rate Schedule 13.

Cropland: Irrigable acreage within the District service area divided into fields based on the *[proprietary]* District Geospatial Data Base compiled from IID records, inspections and U.S. Consolidated Farm Service Agency (CFSA) Common Land Unit (CLU) standards.

District: The Imperial Irrigation District

District Fallowing Program: A program administered by the District to create conserved water by entering into agreements with owners and lessees of agricultural property to fallow Cropland upon terms and conditions set forth in an Agreement for Fallowing Land in the District.

District Water Exchange: A program administered by the District to provide the means by which qualified Agricultural Water Users can offer to sell or buy water during an SDI Water Year.

District Water User: Any user of Agricultural or Non-Agricultural Water supplied by the District.

Eligible Agricultural Acres: Acreage that meets all the following tests:

- a. Farmable Cropland defined as fields, based on the *[proprietary]* IID Geospatial Data Base compiled from District records, inspections and CFSA Common Land Units, greater than 5 acres, used for crop production, fish farming or algae farming.
- b. Current with water availability charges and water bills
- c. Connected to District water distribution system
- d. Each field must (1) have been irrigated for crop production, fish farming, algae farming, leaching, or duck ponds, or under contract to the District Fallowing Program during each of the prior three years; or (2) be the subject of a notice of intent to farm accompanied by a crop plan; or (3) be the subject of other reasonably equivalent evidence of intent to farm during the SDI Water Year

Farm Unit: As part of the Water Card process, Agricultural Water Users can aggregate some or all of their fields (leased or owned) into one account for purposes of managing their water accounts. The amount of apportioned water available on the leased fields included in the Farm

Unit must be approved by the land owner of those fields through the Water Card process.

Environmental Resources Water: Water that the District agrees to provide to habitat or other resource areas pursuant to regulatory permits (excluding water to the Salton Sea for the IID Transfer Project) and water that the District provides pursuant to contract or voluntary to habitat or other resource areas.

Non-Agricultural Water: Water used for municipal needs, industrial needs, feed lots, dairies, or Environmental Resources Water.

Non-Agricultural Water User: A District Water User that uses Non-Agricultural Water within the District.

Straight Line Apportionment: The method used to determine the amount of water available for Agricultural Water Users during an SDI Water Year based on a proration by Eligible Agricultural Acres.

SDI Apportionment: The equitable apportionment of water among District Water Users

SDI Declaration: A declaration by the District Board that the expected demand for District water for a future Water Year exceeds the expected District supply for the same future Water Year

SDI Water Year: A Water Year for which the District Board has made an SDI Declaration

Supply/Demand Imbalance (SDI): The imbalance created when expected demand for District water exceeds the expected supply.

System Loss: Either a direct loss or reduction in water available for apportionment because of seepage, evaporation or other losses in the distribution system.

Unused Water Charge: A dollar amount per acre foot set by the District prior to December 1 preceding an SDI Water Year. This dollar amount per acre foot will be used to calculate the charge for unused water. The Unused water charge for 2009 is \$20 per acre foot.

Water Card: The common term for the "Certificate of Ownership and Authorization of Agent or Tenant" described in Regulation No. 3 of the District's Rules and Regulations Governing the Distribution and Use of Water. The Water Card provides information i.e., Cropland, name and address of owner and any lessees, APN, gate and canal providing water

service, identity of person authorized to order water/receive notices from District, who is obligated to pay, and similar information.

Water Year: Each 12-month period that begins on January 1 and ends on December 31.

Equitable Distribution

Declaration/Termination of Supply/Demand Imbalance:

- a. District shall track actual supply and demand during each Water Year and, based upon District staff's estimates of water supply and demand for the coming Water Year, determine whether the probability of total demand exceeding District's Colorado water supply is greater than fifty percent (50%). If the probability is greater than fifty percent (50%), the District may declare an SDI for the coming Water Year. Such SDI Declaration must be made on or before October 1 and can be withdrawn on or before December 31.
- b. District shall track actual supply and demand during the SDI Water Year. If cumulative consumptive use through June of the SDI Water Year is less than 1.575 MAF, District may terminate the SDI Declaration for that year.

Apportionment of Supply:

Upon SDI Declaration, District shall apportion the Available Water Supply among the types of water users in the District using the following:

- a. Municipal Users - Base amount of 2006 usage plus current District-wide average use per capita multiplied by the increase in population since 2006;
- b. Industrial Users - For existing contracts, estimated based on past use, not to exceed contracted amount and contract terms. For new contracts, estimated based on anticipated use, not to exceed contract amount and contract terms, taking into consideration the Integrated Water Resources Management Plan;

- e. Agricultural Lands - Straight Line Apportionment used. Subtract the estimated demand for categories "a" through "d" above from Available Water Supply, and then divide the remaining supply by the total number of Eligible Agricultural Acres pursuant to "a" through "c" noted under the definition for Eligible Agricultural Acres to determine apportionment per Eligible Agricultural Acre. The amount apportioned to acreage that does not comply with "d" under the definition for Eligible Agricultural Acres will be placed in the District Water Exchange.

Non-Agricultural Water Users:

- a. District shall notify Non-Agricultural Users of their apportionment no later than December 1, prior to the beginning of the SDI Water Year.
- b. Non-Agricultural Water Users shall be allowed to use that amount of water needed for reasonable and beneficial use. If a Non-Agricultural Water User exceeds the amount of apportionment quantified for its usage, the fee for the excess amount of water shall be the Water User's standard water rate plus the Conserved Water Rate.

Agricultural Water Users:

- a. Agricultural Water Users must complete and keep current the Water Card to receive an apportionment and delivery of water. As part of this process, Farm Units must be identified and kept current.
- b. A written notice of the apportionment per Eligible Agricultural Acre of the number of Eligible Agricultural Acres per owner shall be sent to the land owner and the authorized representative no later than December 1 prior to the beginning of the SDI Water Year.
- c. The owner or authorized representative of Eligible Agricultural Acres must accept or reject in writing some or all of the SDI Apportionment on a take-or-pay basis within sixty (60) days of the notice of the SDI Apportionment. Payment for the accepted apportioned water shall be made monthly based on actual use. On December 31 of the SDI year, any remaining amount of unused water part of the take-or-pay obligation will be included in the year end invoice.

District Water Exchange

Eligibility: Any Agricultural Water User can be a Buyer. Any Agricultural Water User with an SDI Apportionment may be a Seller.

Offers to Sell:

- a. An Agricultural Water User with acres eligible for SDI Apportionment may subsequently send a "Notice of Intention to Sell" to the District indicating the number of Acre Feet of water being offered to the District Water Exchange for immediate sale.
- b. Potential Seller must be current on his take-or-pay obligation.
- c. An Agricultural Water User that has sent a Notice of Intention to Sell to the District may subsequently send a "Notice of Withdrawal of Offer to Sell". The District will honor the Notice of Withdrawal only if the water that was the subject of the original Notice of Intention to Sell has not been sold prior to receipt of the Notice of Withdrawal of Offer to Sell.

Offers to Buy:

- a. An Agricultural Water User may send a "Notice of Intention to Buy" to the District that states the number of acre/feet of water he wishes to acquire from the District Water Exchange.
- b. An Agricultural Water User that has previously sent a Notice of Intention to Buy may subsequently send the District a "Notice of Withdrawal of Offer to Buy." The District will honor the Notice of Withdrawal of Offer to Buy if the District has not previously purchased water from sellers to satisfy the Notice of Intention to Buy.

Priority of Execution of Sell/Buy Offers:

Priority of offers to Sell and/or Buy will be based upon the date of receipt of the Notice of Intention to Sell or Buy. The District will periodically publish on its website the aggregate volume of water from pending Notices of Intention to Sell and/or Buy.

Payment for Water from the Water Exchange:

After the District sells the water that Seller has offered for sale though his Notice of Intention to Sell, the Seller shall have no further take-or-pay obligation for payment of that water. If Seller's water does not sell, he is responsible for his take-or-pay obligation. The buyer shall pay the District the total purchase amount due before receiving the purchased water. The total amount due is based on the Acre Feet of water purchased (not to exceed buyer's Notice of Intention to Buy) multiplied by the purchase price defined as the current District agricultural water rate plus a processing fee on one dollar (\$1) per Acre Foot.

Charge for Unused Water:

If an Agricultural Water User buys additional water through District Water Exchange, then he must either: (a) use the purchased water during the SDI Water Year; or (b) offer the purchased water for sale through the District Water Exchange no later than October 1. If an Agricultural Water User does none of the above and has not used the total of purchased water plus accepted SDI Apportionment on his Eligible Agricultural Acres at the end of the SDI Water Year, such Agricultural Water User shall pay a charge to the District (in addition to his take-or-pay obligation) equal to the Unused Water Charge multiplied by the amount in Acre Feet by which the Agricultural Water User's unused purchased water from the District Water Exchange plus unused accepted SDI Apportionment for the SDI Water Year exceeds five percent (5%) of the amount apportioned to the Agricultural Water User's Eligible Agricultural Acres.

Interface With District Agricultural Land Fallowing Program:

An Agricultural Water User the participates in District's Fallowing Program must assign to the District an amount of the Agricultural Water User's accepted SDI Apportionment equal to the amount of water conserved by fallowing for which the Agricultural Water User is contracted.

- a. If the Agricultural Water User's accepted apportionment is less than his Fallowing Program contracted amount, he may procure this difference from the following sources for which the Agricultural Water User qualifies pursuant to these regulations: the Agricultural Water User's accepted SDI Apportionment on other Eligible Agricultural Acres, or the District Water Exchange.

Miscellaneous:

The General Manager is authorized and directed to do any and all things necessary to implement and effectuate these Regulations.

The General Manager shall provide notice of any changes or revisions to these Regulations to all District landowners and water users.

Water Conservation

IID has urged users to conserve water to plan for the present and future. According to IID News Archives, annual letters from Michael King, IID Water Manager, were sent to 2,300 farmers and land owners in the Imperial Unit. His 2002 letter stated, "I would be remiss in my duties if I did not seek your assistance in helping to conserve water...I ask each and every one of you to look at your operations and take any additional

extraordinary measures you can to conserve water.”¹⁸ His 2003 letter said, “Many of you have taken steps already to manage your water use, and we encourage you to continue those efforts. These traditional tools to conserve water will set the stage for the construction of long-term water conservation methods that will meet the commitments of recently signed agreements.”¹⁹ In 2005, IID launched a survey for growers in the Imperial Valley regarding water conservation. “This survey is the first step of many we will be taking to ensure growers have strong input into developing conservation processes for on-farm and system water savings. Any plan to foster conservation must have the support and broad investment of the growers if it is to succeed,” said Michael King.²⁰

Emergency Preparedness

The following is a brief description of IID operations and its mutual aid program with regards to emergency planning, which was taken from the IID website:

“The Imperial Irrigation District (District) is a public owned utility district. The District is considered a special district in the eyes of the State of California and Federal Government. A special district has to meet the same requirements as a local city pertaining to emergency preparedness and emergency management.

The District is required to go through the appropriate channels regarding mutual aid. In the event of a natural and or manmade disaster, the District would open its Emergency Operations Center (EOC) located at headquarters in Imperial, California. The District will then notify the Operational Area (OA), which is the Imperial County Office of Emergency Services located in Heber, California at the Imperial County Fire Department Station # 2.

If the event called for mutual aid for the District, the District’s EOC would request assistance from the OA. If the OA was unable to fulfill this request it would go to the next highest level, which would be the Regional Emergency Operations Center (REOC), located in Los Alamitos, California.

In the event the REOC was unable to fill the request it would go to the State Operations Center (SOC) located in Sacramento, California. The SOC would fill the request or ask for federal assistance from the Federal Emergency Management Agency (FEMA) a sub - section of the Federal Department of Homeland Security (DHS).”²¹

¹⁸ [IID Urging Water Users to Conserve Water.](#)

¹⁹ [IID Water Urged to Conserve.](#)

²⁰ [IID to Launch Valley - Wide Survey of Growers for Water Conservation Effort.](#)

²¹ [Imperial Irrigation District Mutual Aid Program.](#)

In the case of an emergency, IID is prepared to utilize its existing facilities to analyze whatever situation(s) maybe present, and administer the necessary procedure(s) to hopefully alleviate the problem. The following was taken from the IID website:

“The District has a current EOC located at District Headquarters located in the Water Control Conference Room. The conference room can be converted into an active EOC within 30 minutes. The EOC has a back up generator in case of power failure, which is capable of running for 72 hours with out refueling. The EOC is equipped with phones, radios, computers, maps, etc.”²²

²² Imperial Irrigation District Internal Preparedness.

Section 3: Water Availability for a 20-year Projection to Meet Existing Demands

Table 6 shows the projected populations that have been calculated using populations for 1992 and 2003 that were provided in the Imperial County General Plan. The method of calculation under the Population Projection component on pages 21 and 22 was used to calculate estimated populations for the particular years in **Table 6**. In 2008, the population is estimated to be 166,120 people with a projected water consumption of 46,520 acre-feet per year. In 2028, the population is estimated to be 227,000 with a water consumption of 63,568 acre-feet per year.

Year	Projected Population	Gallons per Year**	Acre-Feet***
2008	166,120	15,158,450,000	46,520
2013	181,340	16,547,275,000	50,782
2018	196,560	17,936,100,000	55,044
2023	211,780	19,324,925,000	59,306
2028	227,000	20,713,750,000	63,568

*Water consumption levels are only for residential

**Gallons were based on 250 gallons per person per day multiplied by 365 days per year

***1 Acre-foot = approximately 325,851 gallons

Table 7 summarizes the projected water consumption for Imperial County from 2008 to 2028. With regard to annual agricultural consumption, the most recent information available was from 2007, which was 2,593,541 acre-feet. In an effort to address water demands for uses other than agricultural and residential, **Table 7** has a miscellaneous land use consumption column. 6,864 acre-feet per year for miscellaneous land use consumption was calculated using the following method:

- (2007 - 2003) * 3,044 people / year = 12,176 people
- 2003 pop. + estimated difference between years = 2007 pop.
- 150,900 people + 12,176 people = **163,076 people in 2007**

- 163,076 people * 250 gallons per day * 365 days per year = 14,880,685,000 gallons per year
- 14,880,685,000 gallons per year / 325,851 gallons = **45,667 +/- Acre-feet consumed by 2007 population**

- 2007 delivered - 2007 delivered for agriculture - 2007 population consumption = 2007 miscellaneous land use consumption
- 2,646,072 acre-feet - 2,593,541 acre-feet - 45,667 acre-feet = **6,864 acre-feet**

In an effort to keep the analysis conservative, 10,000 acre-feet per year was used as the miscellaneous land use consumption for each of the years in **Table 7**. After deducting agricultural consumption, population consumption and miscellaneous land use consumption from Imperial Irrigation District's annual apportionment of 3,100,000 acre-feet, an available quantity of water beyond the projected use is estimated for each of the years in **Table 7**. The estimated quantities for 2008 and 2028 are 449,939 and 432,891 acre-feet respectively.

Year	Population Consumption	Agricultural Consumption*	Misc. Land Use Consumption	Total County Consumption	Beyond Projected Use**
2008	46,520	2,593,541	10,000	2,650,061	449,939
2013	50,782	2,593,541	10,000	2,654,323	445,677
2018	55,044	2,593,541	10,000	2,658,585	441,415
2023	59,306	2,593,541	10,000	2,662,847	437,153
2028	63,568	2,593,541	10,000	2,667,109	432,891

*Agricultural consumption is based on water delivery for agriculture in 2007 from the Imperial Irrigation District 2007 Annual Report, pg. 20. It is assumed that as more growth occurs in the Imperial County agriculture acreage will decrease; therefore, agricultural water consumption will decrease as well. For the purpose of this study, agricultural water consumption has remained stable from 2007 to keep the analysis conservative.

**Beyond Projected Use for each year was calculated by subtracting the total county consumption from IID's annual apportionment, which is 3,100,000 acre-feet per year.

Section 4: Expected Water Demands for the Project

This section summarizes three estimated water demands for the EBGDP. The first demand is the annual water delivery average for the project area based on 10 consecutive years (1998 - 2007) of delivery records from IID. (See **Table 8**) The second demand uses an average acre-foot formula for Imperial Valley to estimate the project area's water consumption as an agricultural land use. The third demand uses project specific data to calculate the project's water consumption at build-out.

Demand #1: Annual Water Delivery Average (1998 - 2007)²³

IID currently services the EBGDP area with raw water for agricultural production via the Best, Moorhead, Oakley, Rockwood, and Spruce Canals. **Table 8** takes into consideration all canals/gates servicing the project area and summarizes the delivery history from 1998 through 2007. Because some years use greater amounts than others, an average was determined to be the best method of calculating the project area's annual historical use. The EBGDP does not propose to take the entire well field out of agricultural production, but rather a relatively small portion of it. The following is the manner of calculation for determining the portion of the well field that would be taken out of agricultural production as a result of the project at build-out²⁴:

- ◆ 60 +/- Wells (Production and Injection)
= 60 +/- Wells * (2.6 +/- Acres / Well)
= 156 +/- Acres

- ◆ 9 +/- Miles of Injection Pipeline:
= 9 +/- Miles * (5,280 Feet / Mile) * 10 Feet Wide Needed for Pipeline Supports
= 475,200 +/- Square Feet * (1 Acre / 43,560 Square Feet)
= 11 +/- Acres

- ◆ 9 +/- Miles of Production Pipeline:
= 9 +/- Miles * (5,280 Feet / Mile) * 10 Feet Wide Needed for Pipeline Supports
= 475,200 +/- Square Feet * (1 Acre / 43,560 Square Feet)
= 11 +/- Acres

- ◆ Expansion Loops located every 375 Feet along the Production Pipeline:
= (9 +/- Miles * (5,280 Feet / Mile)) ÷ 375 Feet
= 127 Expansion Loops * (160 Square Feet / Expansion Loop)
= 20,320 Square Feet * (1 Acre / 43,560 Square Feet)
= .5 +/- Acres

- ◆ **Total:**
= 156 +/- Acres (+) 11 +/- Acres (+) 11 +/- Acres (+) .5 +/- Acres
= 178.5 +/- Acres

²³ All data regarding historical water usage was provided by the Imperial Irrigation District.

²⁴ Specific data regarding the EBGDP was from the project's Conditional Use Permit Application.

10 Year Total	Annual Average	Annual Average for Area out of Production
159,370 +/-	15,937 +/-	960 +/-

Source: Imperial Irrigation District

According to records available at the Imperial County Assessor's Office, the EBGDP collectively includes 2,998.83 +/- acres of land. The well field, which is the EBGDP area minus the parcel where the power plant would be located (32.75 +/- acres), includes 2,966.08 acres of land. The following is the manner of calculation for determining the amount of water historically used on average by the portion of the well field that would be taken out of agricultural production as a result of the project:

- ◆ Well Field Annual Delivery History for the Portion that would be taken out of Production
 - = 178.5 +/- Acres ÷ 2,966 +/- Acres
 - = 6.02% * 15,937 +/- Acre-feet
 - = **960 +/- Acre Feet**

Of the 2,998.83 +/- acres that comprise the EBGDP and in addition to the well field, Ormat proposes to build a power plant on a 32.75 +/- acre parcel. This would take the entire parcel out of agricultural production. Please refer to **Table 9** for the delivery history for the parcel where the power plant is proposed.

10 Year Total	Annual Average
739 +/-	74 +/-

Source: Imperial Irrigation District

Total historical water usage for the area that would be taken out of agricultural production as a result of the EBGDP takes into account the portion of the well field covered with infrastructure (wells, pipelines and expansion loops) as well as the entire parcel where the power plant would be located. The following is the manner of calculation for determining the amount of water historically used on average by the area that would be taken out of agricultural production as a result of the EBGDP:

- ◆ Annual Delivery History for the Area that would be taken out of Agricultural Production as a Result of the EBGDP:
 - = 960 +/- Acre-feet + 74 +/- Acre-feet
 - = **1,034 +/- Acre Feet**

Annual Average
1,034 +/-

Demand #2: Estimated Water Usage as Agricultural Land

The second demand is the estimated water usage for the project site as an agricultural land use based on the average annual agricultural consumption rate for the Imperial Valley. In an effort to establish an average annual acre-feet per acre quantity for determining agricultural water consumption, the Imperial Irrigation District 2005 Annual Water Report has been referenced. The 2005 Annual Water Report states the following regarding agricultural water usage for 2005²⁵:

- 1. Page 32 states: 2005 Water Delivered for Agriculture: 2,465,013 acre-feet
- 2. Page 30 states: 2005 Total Acres of Crops: 480,535 acres

The average annual acre-feet per acre quantity in this report is 5.13 acre-feet per acre, and was established by using the data mentioned above from pages 30 and 32 of the 2005 Annual Water Report. The average was calculated by using the following method:

$$\begin{aligned}
 &= 2005 \text{ Water Delivered for Agriculture} \div 2005 \text{ Acres of Crops} \\
 &= 2,465,013 \text{ acre-feet} \div 480,535 \text{ acres} \\
 &= \mathbf{5.13 \text{ acre-feet per acre}}
 \end{aligned}$$

To establish the project area's estimated agricultural water usage 5.13 acre-feet per acre is multiplied by the area that would be taken out of agricultural production as a result of the EBGDP, which gives the project's estimated annual agricultural water usage.

- ◆ Assumptions Used:
 - 1. Average agricultural water consumption per acre = 5.13 acre-feet of water per year
 - 2. 178.5 acres as agricultural land
- ◆ Yearly water usage for the EBGDP as agricultural land:
 - = 5.13 acre-feet per year * 178.5 acres
 - = **916 +/- Acre-feet**

Table 11 summaries the agricultural water usage for the EBGDP. The table gives the estimated annual water usage for the project area based on a consumption rate of 5.13 acre-feet per acre per year. It also provides the annual water usage for the project area based on the 10-year water delivery history provided by IID.

Table 11: Agricultural Water Usage for EBGDP Area Based on Consumption Rate of 5.13 ac-ft/yr	
Demand per Average Acre Usage in Imperial Valley	Annual Average
Average of Property's 10-year History Provided by IID	916 +/-
Average of Property's 10-year History Provided by IID	1,034 +/-

²⁵ The IID 2005 Annual Water Report is the most recent set of records that provides the acreage of agricultural land receiving IID water, as well as the total quantity of water delivered for agriculture.

Demand #3: Project Water Usage at Build-out

The third demand for the EBGDP is the estimated water usage at full build-out. According to the project management staff of Ormat, the EBGDP would use 5,500 acre-feet of water per year, which would be almost entirely consumed in the power plant's cooling water system. A relatively small portion would be consumed in the control room building and labeled as non-potable. The project is not scheduled to have more than 25 employees during operations. Bottled drinking water would be provided by Ormat for all employees via a third party vendor.

	Agricultural Water Usage	Build-out Water Usage	Percentage Increase
Annual Estimated Water Use	916 +/- Acre-feet / year	5,500 +/- Acre-feet / year	500.44 %

	Agricultural Water Usage	Build-out Water Usage	Percentage Increase
Annual Estimated Water Use	1,034 +/- Acre-feet / year	5,500 +/- Acre-feet / year	431.91 %

Section 5: Foreseeable Planned Water Demands to be served by Imperial Irrigation District

The links between IID provided water and consumers like farmers, municipalities and industrial users are symbiotic and historical. Based on projected populations calculated from data provided in the Imperial County General Plan, and agricultural consumption provided in the Imperial Irrigation District 2007 Annual Report, estimated water demands have been calculated through 2028. In the present year, IID water demand is estimated at approximately 449,939 acre-feet below its annual apportionment of 3,100,000 acre-feet. In 2028, it is projected that the IID will use approximately 2,667,109 acre-feet of Colorado River water, which is 432,891 acre-feet less than its annual apportionment. See **Table 14**.

Year	Population Consumption	Agricultural Consumption*	Misc. Land Use Consumption	Total County Consumption	Beyond Projected Use**
2008	46,520	2,593,541	10,000	2,650,061	449,939
2013	50,782	2,593,541	10,000	2,654,323	445,677
2018	55,044	2,593,541	10,000	2,658,585	441,415
2023	59,306	2,593,541	10,000	2,662,847	437,153
2028	63,568	2,593,541	10,000	2,667,109	432,891

*Agricultural consumption is based on water delivery for agriculture in 2007 from the Imperial Irrigation District 2007 Annual Report, pg. 20. It is assumed that as more urban growth occurs in the Imperial County agriculture acreage will decrease; therefore, agricultural water consumption will decrease as well. For the purpose of this study, agricultural water consumption has remained stable from 2007 to keep the analysis conservative.

**Beyond Projected Use for each year was calculated by subtracting the total county consumption from IID's annual apportionment of 3,100,000 acre-feet per year.

Findings

1. IID serves as the regional water supplier, importing raw Colorado River water and delivering it, untreated, to agricultural, municipal, and industrial water users within its Service Area.
2. IID is a raw water retailer and a domestic raw water wholesaler, and does not supply potable drinking water.
3. In 2007, IID delivered 2,646,072 acre-feet of water to the Imperial Unit. 2,593,541 acre-feet or 98.01 percent of its flows in 2007 were to agricultural users.
4. As urban growth continues in Imperial County agricultural water usage may decline due to the transfer of water consumption to other land uses.
5. In the case of a Supply Demand Imbalance, IID's Equitable Distribution Plan gives water delivery priority to municipal and industrial users over agricultural users.
6. Historically, IID has never been denied the right to use the amount of water it has requested for agricultural purposes and other beneficial uses.
7. IID has an annual apportionment of 3.1 million acre-feet of Colorado River water per year.
8. Current and projected water supplies for the Imperial Unit exceed projected water demands for a 20 year projection.
9. In 2005, there were 480,535 acres of agricultural land in the Imperial Unit. Collectively, this land received 2,465,013 acre-feet of water from IID. Based on this information, an acre of agricultural land in the Imperial Unit uses 5.13 acre-feet of water per year on average.
10. The area that would be taken out of agricultural production as a result of the EBGDP is estimated to use 916 acre-feet per year as farmland based on the calculation in Section 4 of this report, which uses a consumption rate of 5.13 acre-feet per acre annually. Based on the history of water delivered to the same area by IID from 1998 to 2007, on average the project site has received 1,034 acre-feet per year. A change in land use from agricultural to industrial for the area that would be taken out of agricultural production as a result of the EBGDP results in an annual consumption of 5,500 acre-feet per year. This is an increase of 500.44 +/- and 431.91 +/- percent when compared to the annual water usage for the area that would be taken out of agricultural production as a result of the EBGDP based on a consumption rate of 5.13 acre-feet per acre per year, and the average of IID's 10-year annual delivery history for the same area respectively.

Conclusion

This Water Supply Assessment has determined that IID's water supply is adequate to service the Imperial Unit. An annual surplus of more than 430,000 gallons is projected to be present in Imperial Unit through 2028; however, (3) project-specific mitigation measures as noted under the Project Water Service and IID System Mitigation section of this report are recommended for consideration, collectively or individually, in order for Ormat to have ample water for operation of the EBGDP.

The area that would be taken out of agricultural production as a result of the EBGDP is estimated to use 916 acre-feet per year as farmland based on the calculation in Section 4 of this report, which uses a consumption rate of 5.13 acre-feet per acre annually. Based on the history of water delivered to the same area by IID from 1998 to 2007, on average the project site has received 1,034 acre-feet per year. A change in land use from agricultural to industrial for the area that would be taken out of agricultural production as a result of the EBGDP results in an annual consumption of 5,500 acre-feet per year. This is an increase of 500.44 +/- and 431.91 +/- percent when compared to the annual water usage for the area that would be taken out of agricultural production as a result of the EBGDP based on a consumption rate of 5.13 acre-feet per acre per year, and the average of IID's 10-year annual delivery history for the same area respectively.

Based on IID's apportionment of 3,100,000 acre-feet of Colorado River water per year, and adoption of IID Resolution 22-2008, which includes an Equitable Distribution Plan to be used in the instance of an SDI, Imperial Unit water supply is adequate to service municipal and industrial water users. IID approved the Negative Declaration (ND) for the Equitable Distribution Plan and determined that the ND provided a sufficient assessment of the environmental impacts of the Equitable Distribution Plan pursuant to CEQA, and that there was no substantial evidence that the Equitable Distribution Plan will have a significant effect on the environment. Since its inception in 1911, IID has never been denied the right to divert the amount of water it has requested for agricultural purposes to other beneficial uses. As long as the appropriate infrastructure for service and conservation measure(s) for system impacts are in place, the amount of water available and the stability of the water supply chain ensure that this development's water needs will be met for the next 20 years.

Common Acronyms

AC	Acre
AF	Acre-Foot
AFY	Acre-Feet per Year
CEQA	California Environmental Quality Act
CSA	County Service Area
DDE	Development Design & Engineering, Inc
DU	Dwelling Units
EBGDP	East Brawley Geothermal Development Project
EPA	Environmental Protection Agency
EDP	Equitable Distribution Plan
EPP	Emergency Preparedness Program
GPD	Gallons per Day
GPCPD	Gallons per Capita per Day
GPDPA	Gallons per Day per Acre
GP	General Plan
GPM	Gallons per Minute
GPPPD	Gallons per Person per Day
GPU	General Plan Update
IID	Imperial Irrigation District
MAF	Million Acre-feet
MF	Multi Family
Mg	Milligram
MG	Million Gallons
MGD	Million Gallons per Day
MGY	Million Gallons per Year
Mg/L	Milligrams per Litter
MSL	Mean Sea Level
N/A	Not Applicable
NAFTA	North American Free Trade Agreement
NBGDP	North Brawley Geothermal Development Project
ND	Negative Declaration
PVC	Polyvinyl Chloride
PVID	Palo Verde Irrigation District
PWWF	Peak Wet Weather Flow
QSA	Quantification Settlement Agreement
R1	Low Density Residential
SB	Senate Bill
SDWA	Safe Drinking Water Acts
SF	Single Family
TDS	Total Dissolved Solids
WSA	Water Supply Assessment
WTP	Water Treatment Plant
WWTP	Waste Water Treatment Plant

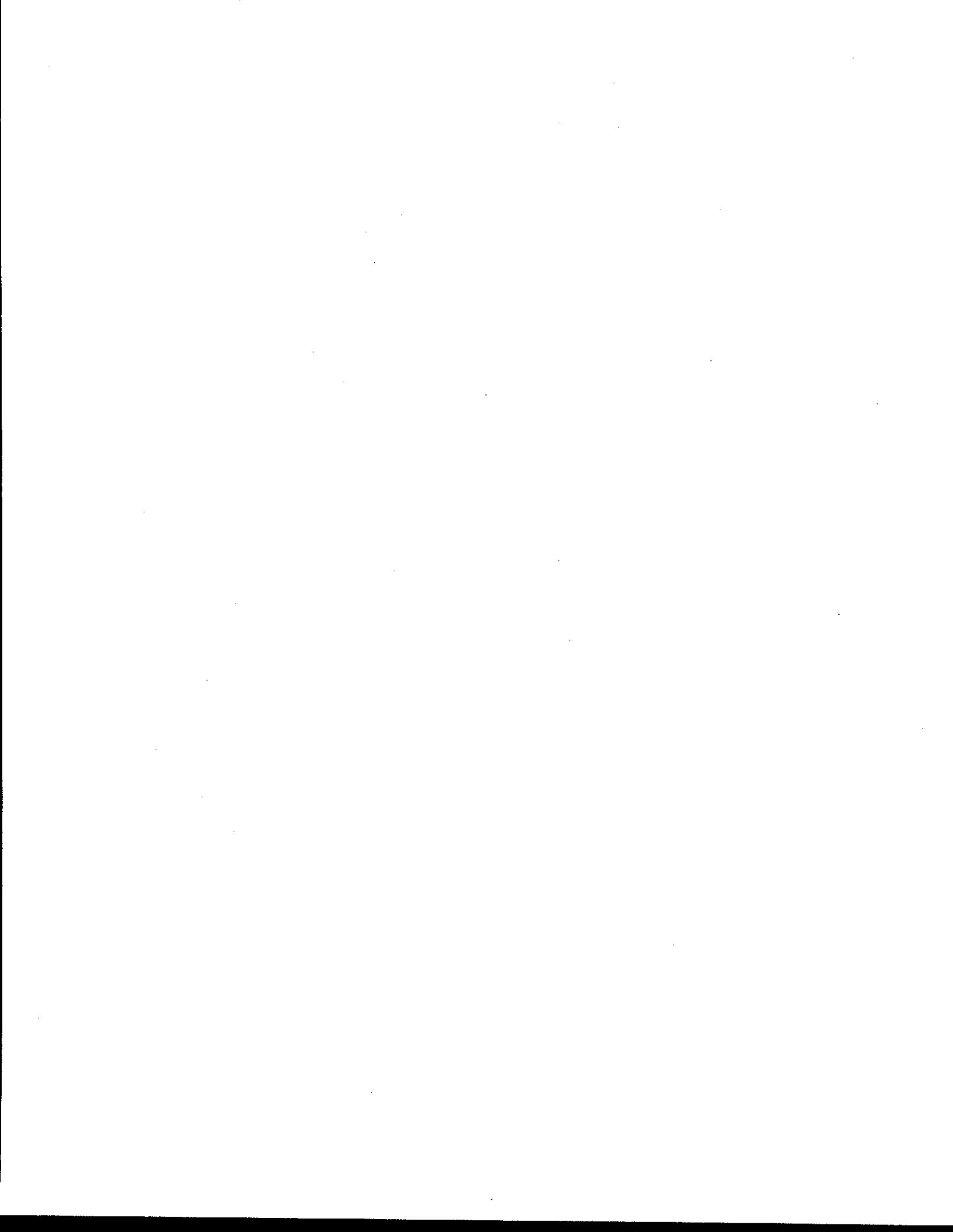
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EXHIBIT 29



North Brawley System Impact Study

An Analysis for the
Imperial Irrigation District



~Final Report~
December 11, 2007

REVISION 1
January 8, 2009

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Appendix F – Short Circuit Analysis

Appendix G – Sensitivity Short Circuit Analysis

Appendix H – Post-Transient Stability Analysis

Revision #1:

The North Brawley project representative reported via email to IID Energy Department a change on the project Phase B 13.2/92 kV transformer impedance value on November 24, 2008. The new transformer impedance value changed from 12% @ 37 MVA base to 12% @ 55 MVA base. It triggered the need for re-study the North Brawley project system impact study on the power flow and short circuit analyses sections.

The re-study was considering the following: a) The North Brawley project modeled with all the three phases (A, B, and C) in-service, b) The original IID system topology and c) The IID system demand and generating resources as in the Final Report issued on 12/11/2007.

The purpose of the re-study was to compare study results by implementing the transformer impedance value change and determine if there will be any new or modification to the previously reported system impact that requires mitigation.

The re-study results for the power flow (Heavy Summer and Light Winter conditions) and short circuit (all generation in-service) analyses were very similar to the ones obtained before making the transformer impedance change. The most relevant change in study results was on the short circuit value for the Euclid Substation 92 kV bus which before the change was 20,159 Amperes (101 % of the breaker interrupting capability) and after the transformer impedance change it became 20,172 Amperes (101%). This represents a breaker interrupting capability violation that requires mitigation.

Therefore, once we have completed the re-study for this project, IID does not report any new or modification to the previously reported system impacts that require mitigation. The differences between the Final Report and the attached Revision #1 are the following:

- This additional summary page
- Appendix F – Short Circuit Analysis
- Appendix G – Sensitivity Short Circuit Analysis

If you have any questions, please call me at (760) 482-3443.

Jorge L. Barrientos, PE
IID System Planning Supt.

EXECUTIVE SUMMARY

Power Flow Analysis

KEMA Inc. and IID's Planning Section performed the Power Flow Analysis to review the impact of the proposed North Brawley 150 MW generation project ("Project") when delivering power to IID internal electrical network (50 MW), (50 MW) to SCE and 50 MW for North Brawley load project in the 2010 timeframe. The base case has modeled the new IID Niland Generation Project with 100 MW (Heavy Summer ON-Line, Light Winter OFF-Line). The Project was modeled as Twelve 12.5 MW generators connected to the "CO" 92 kV line. The System Impact Study included power flow, transient and post-transient stability analysis for peak (heavy summer) and off-peak (light winter) conditions, modeled using Western Electric Coordinating Council ("WECC") cases with a detailed IID system representation for 2010. The short circuit analysis, performed by PDS consulting, PLC, is also included as part of this system impact study at the request of IID.

For the conditions modeled, the system impact study indicated that the addition of the North Brawley Project will have some impact on IID's voltage and thermal loading conditions for the different scenarios studied under normal and contingency conditions. Voltage deviation and thermal rating violations attributable to the addition of the Project will require the design and implementation of a few System Operating Procedures (SOPs) and/or system upgrades. The addition of the Project and its associated dispatch to Southern California Edison showed 2.5 MW increase on IID system losses for the Heavy Summer and 5.0 MW for the Light Winter system condition. The study results show that there were pre-existing voltage and thermal violations under outage conditions that were not attributable to the project. These system violations were not included in this report and are being addressed in other planning forums.

Transient Stability

KEMA Inc. on behalf of Imperial District ("IID") performed this Transient Stability analysis indicated that the addition of the Project does not adversely impact the stability response of the system. On stability outages of the generator transformers, it has been noted that the generator itself must be tripped. Generation tripping for the loss of the step-up transformer is a common practice and does not represent any additional problems to the IID system.

Short Circuit Analysis

A short circuit analysis was performed by PDS consulting, PLC. The executive summary reports the following:

A short circuit study and breaker capability analysis has been performed to determine the impact of the additional North Brawley generation facility to the IID Energy transmission system. The analysis found minimal impacts to the interrupting capability of the IID Energy transmission system due to the addition of the North Brawley generation facility. The analysis also found that the interrupting capability of two of the breakers, H40 and H50, at the Euclid Substation will be exceeded (the pre-Project fault levels were at 99% of the interrupting capability while the post-Project fault level was found to be 101%), however IID Energy can re-schedule to an earlier date a project to replace the affected equipment with sufficient interrupting capacity prior to the in-service date of the North Brawley project.

The results of the study also indicated that there are a few fault interrupting devices on the IID Energy system which have fault current exposure levels near of their respective interrupting ratings (specifically Imperial Valley 230kV and El Centro 92kV). However, these interrupting rating concerns have been identified as pre-existing conditions and not directly related to the North Brawley generation project.

Sensitivity Short Circuit Analysis

A sensitivity analysis of to the original short circuit study and breaker capability analysis has been performed per project owner request to determine the impact of the North Brawley project phase A (6 generators in the amount of 12.5MW each) connected to the IID Energy transmission system. The analysis found that the fault duty at the Euclid 92 kV substation will exceed the interrupting capability of two of the breakers, H40 and H50, at this substation (the pre-Project fault levels were at 98.4% of the interrupting capability while the post-Project fault level was found to be 100.04%), Even though these short circuit violations are marginal, the IID standard requires the replacement of these breakers once they reach their interrupting capability.

Post-Transient Stability Analysis

The addition of the North Brawley Project did not impact the existing reactive power margins at selected buses for all the outage simulation studied with the exception of the Imperial Valley – Miguel 500 kV line outage. An outage of the Imperial Valley-Miguel 500 kV line caused the reactive power margin at five (5) IID buses to decrease up to 4 MVAR. In particular, the addition of the North Brawley Project and the subsequent outage of the Imperial Valley –Miguel 500 kV line caused the reactive power margin at N. LAQUITA 92 kV bus to decrease from 103 MVAR to 99 MVAR.

A summary of the post-transient reactive power margin analysis can be found at Appendix B. Positive reactive power margins were obtained at all the buses monitored following the selected outages.

1 INTRODUCTION

KEMA Inc. and PDS Consulting, on behalf of Imperial Irrigation District (“IID”), performed this System Impact Study to review the impact of the proposed North Brawley 150 MW generation project (“Project”) when delivering power to IID internal network (50 MW), (50 MW) to SCE and 50 (MW) to serve the Project internal load in the 2010 timeframe. The base case has modeled the new IID Niland Generation Project with 100 MW (Heavy Summer ON-Line, Light Winter OFF-Line). The Project was modeled as Twelve 12.5 MW generators connected to the “CO” 92 kV line. The System Impact Study included power flow, transient and post-transient stability analysis for peak (heavy summer) and off-peak (light winter) conditions, modeled using Western Electric Coordinating Council (“WECC”) cases with a detailed IID system representation for 2010. The short circuit analysis, performed by PDS consulting, PLC, is also included as part of this system impact study at the request of IID.

2 STUDY ASSUMPTIONS

2.1 Cases Studied

This North Brawley analysis used power flow models representative of an IID 2010 system. The following peak (heavy summer) and off-peak (light winter) scenarios were studied:

Season	PSLF Case Name	Description
Heavy Summer	Pre-Project	Planned heavy summer configuration without the Project
Heavy Summer	Post-Project	Planned heavy summer configuration with Project - net output 100 MW
Light Winter	Pre-Project	Planned light winter configuration without the Project
Light Winter	Post-Project	Planned light winter configuration with the Project - net output 100 MW

2.2 Case Assumptions

The two WECC Approved Power Flow Base Cases used to develop the North Brawley System Impact Study were:

Heavy summer 10hs1a.SAVApproved 08/24/05
 Light winter 12lw1sa.SAVApproved 01/19/06

Both cases were selected because they were the most recently developed and available cases in the WECC library in the vicinity of the Project’s in-service date. The IID system loads, resources, and topology were adjusted to represent the conditions expected in the year the Project planned to initiate operations.

The 2010 case used to model the impact of the Project included planned transmission elements internal to the IID system for the timeframe as well as the following changes to the base case:

- Generation was modeled according to the IID’s current generation interconnection (IID Queue list) that reflects generation expected to be in operation during the study time frame. The generation at Niland 92 kV substation was dispatched according to typical usage, Heavy Summer ON-Line, Light Winter OFF-Line.
- IV -- Dixieland 230 kV line and 230/92 kV transformer.
- El Centro 230/92 kV transformer.

2.3 Dynamic Models

The stability models used for the Project were provided by the Project sponsor and included: **Generator** – GENSA1 - Salient pole generator represented by equal mutual inductance rotor modeling.

Exciter – EXAC8B – Brushless exciter with PID voltage regulator.

Governor – W2301- Woodward 2301 governor and basic turbine model.

2.4 Loads and Resources

The table below shows the IID loads, losses, generation, and area interchange for the cases studied.

Case	Summer Pre	Summer Post	Winter Pre	Winter Post
Load (MW)	1193.6	1243.6	268.5	318.5
Load (MVAR)	443.8	474.7	60.7	91.6
Losses (MW)	58.1	59.5	37.0	42.7
Losses (MVAR)	323.5	332.6	195.3	243.3
Interchange (MW)	74	174	770.7	870.3
Total IID Shunts (MVAR)	-558.7	-587.8	-197.4	-214.4
IID Generation (MW)	1325.5	1476.9	1076.3	1231.5
IID Generation (MVAR)	179.9	209.7	60.7	112.1

2.5 Power Flow Evaluation Criteria

For this analysis, the system was evaluated for its thermal loading capacity and voltage performance (primarily voltage drop). The system was evaluated both with all lines in service and under emergency or unplanned outage conditions that might occur such as the outage of a line or transformer. WECC Reliability Criteria and the North American Electric Reliability Council (“NERC”) Planning Standards were used to evaluate the system as noted below. While the NERC/WECC criteria are applicable, the interconnecting transmission system owner/operator may have stricter voltage or thermal conditions based on operating or reliability needs.

The following criteria were used to determine the impact of the facility on IID’s system for pre-contingency and post-contingency conditions:

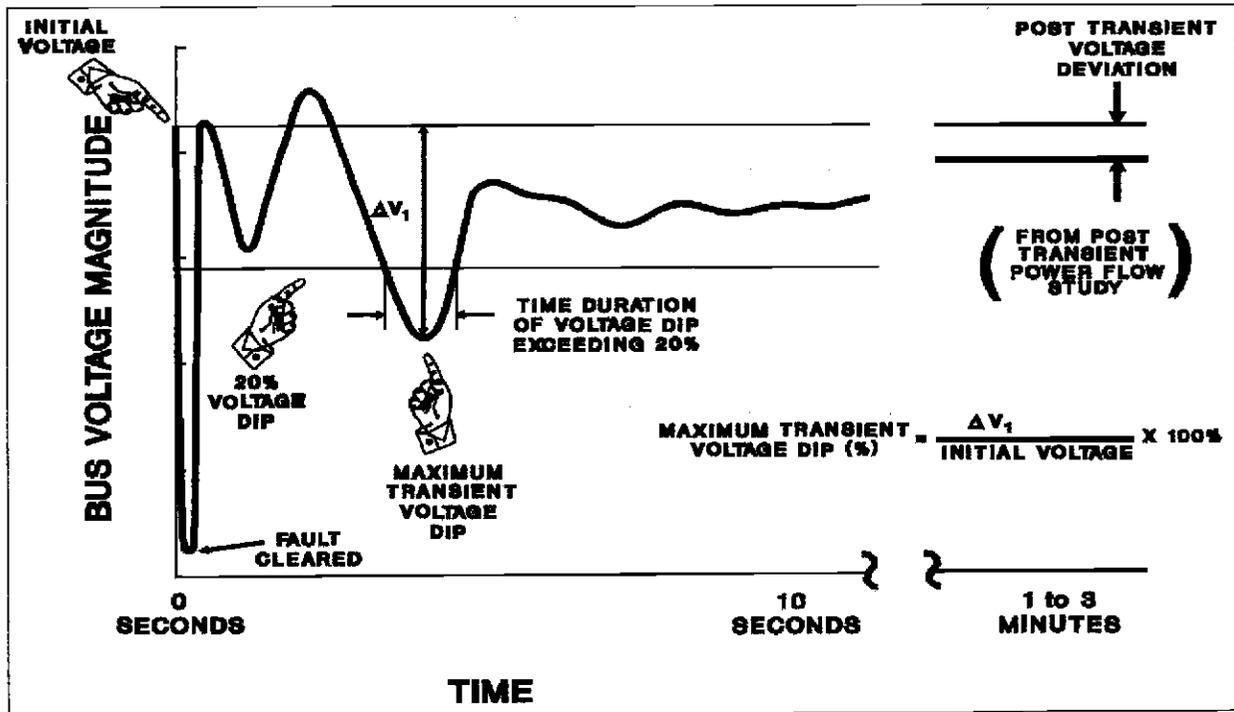
- Pre-disturbance bus voltage must be between 0.95 per unit and 1.05 per unit. (an IID-specific requirement)
- Allowable voltage deviation of five (5) percent for N-1 Contingencies (deviation from pre-disturbance voltage).
- Allowable voltage deviation of ten (10) percent for N-2 contingencies (deviation from pre-disturbance voltage).
- Post-transient bus voltage must be at least 0.90 per unit (an IID-specific requirement)
- Pre- and post-disturbance loading to remain within the emergency ratings of all equipment and line conductors. The emergency ratings are determined by the owner/operator of each equipment item.

As applied in the analysis, all tables and results for loading criteria were based on the normal or continuous rating (Rating 1) for all lines in service conditions and the emergency rating (Rating 2) for outage conditions.

2.6 Stability Analysis Evaluation Criteria

The following NERC/WECC stability criteria¹ were used to evaluate the impact of the Project:

NERC and WECC Categories	Outage Frequency Associated with the Performance Category (outage/year)	Transient Voltage Dip Standard	Minimum Transient Frequency Standard	Post Transient Voltage Deviation Standard
A System normal	Not Applicable	Nothing in addition to NERC		
B One element out-of-service	≥ 0.33	Not to exceed 25% at load buses or 30% at non-load buses. Not to exceed 20% for more than 20 cycles at load buses.	Not below 59.6Hz for 6 cycles or more at a load bus.	Not to exceed 5% at any bus.
C Two or more elements out-of-service	0.033 – 0.33	Not to exceed 30% at any bus. Not to exceed 20% for more than 40 cycles at load buses.	Not below 59.0Hz for 6 cycles or more at a load bus.	Not to exceed 10% at any bus.
D Extreme multiple-element outages	< 0.033	Nothing in addition to NERC		



¹ Reference: Western Electricity Coordinating Council NERC/WECC Planning Standards, Revised August 9, 2002, page 12-13.

3 STUDY METHODOLOGY

3.1 *Power Flow Methodology*

Power flow analysis considers a snapshot in time where tap changing transformers, static var devices, and phase-shifters have had time to adjust. In addition, a swing generator balances generation and load (plus losses) on the system during each contingency scenario. All power flow analysis was conducted with version 16 of General Electric's PSLF software. Power flow results were monitored and reported for the IID area.

Thermal and voltage performance of the system was evaluated under normal N-0 (no contingency), emergency N-1 (single contingency) and select N-2 (double contingency) conditions. Thermal loadings were reported when a modeled transmission component loaded to 100% or more of its normal MVA rating (as provided in the power flow database).

Transmission voltage violations for normal N-0 (no contingency) conditions were reported where per unit voltages were less than 0.95 or greater than 1.05. Emergency (N-1, single contingency and N-2 double contingencies) voltage violations were reported when per unit voltage was less than 0.90 or greater than 1.05. In addition, voltage deviations between the pre- and post-contingency conditions were recorded whenever these deviations were greater than 5% for single contingencies and 10% for double contingencies between the pre- and post-Project power flow cases.

3.2 *Transient Stability Methodology*

Transient stability analysis is a time-based simulation that assesses the performance of the power system shortly before, during, and shortly following a contingency. Transient stability studies were performed to verify the stability of the system following a system fault.

Transient stability analysis was performed based on WECC Disturbance-Performance Criteria for selected system contingencies using version 16 of General Electric's PSLF software. Transient stability contingencies were simulated for 10 seconds, including 1 second of pre-disturbance data and 9 seconds of post disturbance response. All faults for all voltages assumed a 4 cycle breaker clearing time. System damping was assessed visually with the aid of stability plots.

The following parameters were plotted on the stability plots:

Rotor Angle

The rotor angle plots assist in determining how the proposed Project would swing with respect to other generators in the area. The plots indicate whether the unit would remain synchronous with the rest of the system following a disturbance.

Generator Speed

The generator speed plots, assist in determining how the proposed Project would react (speed up, slow down) with respect to other generators in the area. The plots indicate whether the unit would remain synchronous with the rest of the system following a disturbance.

Bus Voltage

Bus voltage plots provide a means of detecting out-of-step conditions and are useful to assess the magnitude and duration of post disturbance voltage dips and peak-to-peak voltage oscillations. The voltage plots also indicate system damping response and the expected bus voltage following the disturbance.

Bus Frequency

Bus frequency plots provide expected magnitude and duration of post-disturbance frequency swings as well as indicating possible over-frequency or under-frequency conditions.

3.3 Post-Transient Stability Methodology

The WECC/NERC standard was used to assess the adequacy of the study results. The post-Transient analysis related evaluation criteria used are:

Maximum voltage deviations allowed at all buses in the post-transient time frame will be 5% for N-1 and 10% for N-2 unless a lower standard has been previously adopted on selected buses. Southern California Edison (SCE) allows a lower standard of 7% post-transient voltage deviation for N-1 contingencies. Table 1 also provides a summary of the WECC/NERC post-transient deviation standard.

The post-transient reactive power margin analysis evaluated criteria used are:

- Minimum reactive power margin at any bus following N-1 outage is 100 Mvar
- Minimum reactive power margin at any bus following N-2 outage is 50 Mvar.

NERC and WECC Categories	Outage Frequency Associated with the Performance Category (outage/year)	Transient Voltage Dip Standard	Minimum Transient Frequency Standard	Post Transient Voltage Deviation Standard
A System normal	Not Applicable	Nothing in addition to NERC		
B One element out-of-service	□ 0.33	Not to exceed 25% at load buses or 30% at non-load buses. Not to exceed 20% for more than 20 cycles at load buses.	Not below 59.6Hz for 6 cycles or more at a load bus.	Not to exceed 5% at any bus.
C Two or more elements out-of-service	0.033 – 0.33	Not to exceed 30% at any bus. Not to exceed 20% for more than 40 cycles at load buses.	Not below 59.0Hz for 6 cycles or more at a load bus.	Not to exceed 10% at any bus.
D Extreme multiple-element outages	< 0.033	Nothing in addition to NERC		

Table 1: WECC/NERC Post-Transient and Stability Analysis Evaluation Criteria

4 PEAK (HEAVY SUMMER) POWER FLOW FINDINGS

This section provides the results obtained by applying the assumptions and methodology. It illustrates the findings associated with the power flow analysis for the peak, heavy summer condition.

4.1 Peak (heavy summer) Pre and Post Project Cases

The pre-project case was used as a benchmark for the analysis. The post-Project case energized the North Brawley Project connected radial to the Calipatria – Park View 92 kV line and scheduled 50 MW of power for delivery to Southern California Edison.

As compared to the benchmark (pre-Project) case, the addition of the Project showed a few voltage and thermal loadings violations. These violations were noted in the base case under both, the single and double contingency scenarios. Below are violations attributable to the project as shown in the following tables. The impact to IID system losses was 2.5 MW. The primary direction of flow from the Project was towards the Park View substation.

The tables depict voltage deviation greater than 5% for N-1 conditions and greater than 10% for N-2 conditions.

N-1 Voltage Deviation Findings

Bus	Name	kV	Area	Zone	Outage	Pre	Post	Outage description
8378	SALTCITY	92	8	163	Line 8	0.0495	0.0509	Line AVE58-OASIS 92 Circuit 1

N-2 Voltage Deviation Findings

Bus	Name	kV	Area	Zone	Outage	Pre	Post	Outage description
NONE								

4.2 Peak (heavy summer) Loading Comparison tables

To ease the comparison between cases, the following tables show the loading on IID elements for all equipment in service (no outage, N-0) and for contingency conditions (N-1 and N-2). Overload percentages are based on the continuous rating for N-0 conditions and emergency ratings for contingency conditions. IID, for screening purposes, typically uses identical continuous and emergency ratings for its facilities. Typically 110% of continuous rating is an acceptable emergency rating.

4.2.1 Peak (heavy summer) N-0 Continuous Loading

No thermal loading violations were observed on any IID system element prior to simulating a contingency outage. This observation applies to both the pre-project and post-project summer cases.

4.2.2 Peak (heavy summer) N-1 Single Contingency Loading

The following table shows the element loadings for the most significantly overloaded elements and shows the impact the Project has on the loadings of elements due to outages. Please refer to Appendix B (Pre) and Appendix C (Post) for all the loading data.

Case	Element	Bus	Line	Rating	Capacity	Contingency	Outage	Pre-Contingency	Post-Contingency	Outage description
8279	CVSUB	92	8808	CVSUB161	161	1	Tran	125	tran_96	95.30% 103.30% Tran AVE58 92.00 to AV58 161.00 Circuit 1
8281	AVE58	92	8805	AV58	161	1	Tran	125	line_4	98.50% 101.60% Line CVSUB 92.0 to JACKSON 92.0 Circuit 1
8281	AVE58	92	8805	AV58	161	1	Tran	125	line_8	97.40% 100.60% Line AVE58 92.0 to OASIS 92.0 Circuit 1

4.2.3 Peak (heavy summer) N-2 Double Contingency Loading

The following table shows the element loadings for the most significantly overloaded elements and shows the impact the Project has on the loadings of elements due to outages. Please refer to Appendix B (Pre) and Appendix C (Post) for all the loading data.

Case	Element	Bus	Line	Rating	Capacity	Contingency	Outage	Pre-Contingency	Post-Contingency	Outage description
NONE										

4.3 Peak (heavy summer) Element Flow

The following table highlights the magnitude (not direction) of flow (in MW) of various IID elements and WECC-defined paths under continuous conditions.

Element (unit of measure)	Summer Pre	Summer Post
EC 161/230 Transformer (MW)	6.6	0.2
AVE 58 161/92 Transformer Circuit 1 (MW)	109.4	113.3
NILAND 161/92 Transformer Circuit 1 (MW)	4.1	17.2
CV 92/161 Transformer Circuit 1 (MW)	44.9	52.3
IV 500/230 Transformer Circuit 1 (MW)	104.2	147.2
IV 500/230 Transformer Circuit 2 (MW)	23.4	33.1
Niland-Blythe 161 kV (MW)	-117.7	-109.1
Niland-Blythe 161 kV (MVAR)	34.3	30.8
IV-EI Centro SW 230 kV (MW)	2.3	41.8
IV-EI Centro SW 230 kV (MVAR)	30.8	27.6
Mirage-Ramon 230 kV (MW)	149.5	161.5
Mirage-Ramon 230 kV (MVAR)	-30.5	-20.3
Coachella-Devers 230 kV (MW)	58.0	67.3
Coachella-Devers 230 kV (MVAR)	-21.5	-23.0
Path 42 (MW)	207.2	228.4
Path 42 (MVAR)	-60.5	-65.2
Path 46 (MW)	6210.4	6241.5
Path 49 (MW)	4078.8	4034.4
SCIT (MW)	14218.3	14251.1

5 OFF-PEAK (LIGHT WINTER) POWER FLOW FINDINGS

This section provides the results obtained by applying the assumptions and methodology. It illustrates all findings associated with the power flow analysis for the winter, off-peak, conditions.

5.1 Off-peak (light winter) Pre and Post Project Cases

The pre-project case was used as a benchmark for the analysis. The post-Project case energized the North Brawley Project connected radial to the Calipatria – Park View 92 kV line and scheduled 50 MW of power for delivery to Southern California Edison

As compared to the benchmark (pre-Project) case, the addition of the Project showed a few voltage and thermal loadings violations. These violations were noted in the base case under both, the single and double contingency scenarios. The highlighted violations are attributable to the project as shown in the following tables. The impact to IID system losses was 5.0 MW. The primary direction of flow from the Project was towards the Park View substation.

The tables depict voltage deviation greater than 5% for N-1 conditions and greater than 10% for N-2 conditions.

N-1 Voltage Deviation Findings

Bus	Output description
NONE	

N-2 Voltage Deviation Findings

Bus	Output description
NONE	

5.2 Off-peak (light winter) Loading Comparison tables

To ease the comparison between cases, the following tables show the loading on IID elements for all equipment in service (no outage, N-0) and for contingency conditions (N-1 and N-2). Overload percentages are based on the continuous rating for N-0 conditions and emergency ratings for contingency conditions. IID, for screening purposes, typically uses identical continuous and emergency ratings for its facilities. Typically 110% of continuous rating is an acceptable emergency rating.

5.2.1 Off-peak (light winter) N-0 Continuous Loading

No thermal loading violations were observed on any IID system element prior to simulating a contingency outage. This observation applies to both the pre-project and post-project winter cases.

5.2.2 Off-peak (light winter) N-1 Single Contingency Loading

The following table shows the element loadings for the most significantly overloaded elements and shows the impact the Project has on the loadings of elements due to outages. Please refer to Appendix D (Pre) and Appendix E (Post) for all the loading data.

From	Name	kV	To	Name	kV	ck	Type	MVA	Outage	Pre	Post	Outage description
8331	ELCENTSW	161	8335	ELSTEAMP	92	1	Tran	125	line 42	77.8%	107.8%	Line ELCENTSW 230.0 to IMPRLVLY 230.0

5.2.3 Off-peak (light winter) N-2 Double Contingency Loading

The following table shows the element loadings for the most significantly overloaded elements and shows the impact the Project has on the loadings of elements due to outages. Please refer to Appendix D (Pre) and Appendix E (Post) for all the loading data.

From	Name	kV	To	Name	kV	ck	Type	MVA	Outage	Pre	Post	Outage description
NONE												

5.3 Off-peak (light winter) Element Flow

The following table highlights the magnitude of flow (in MW) of various IID elements and WECC-defined paths under continuous conditions.

Element (unit of measure)	Winter Pre	Winter Post
EC 161/230 Transformer (MW)	23.4	29.8
AVE 58 161/92 Transformer Circuit 1 (MW)	29.3	38.1
NILAND 161/92 Transformer Circuit 1 (MW)	22.1	40.1
CV 92/161 Transformer Circuit 1 (MW)	22.7	30.2
IV 500/230 Transformer Circuit 1 (MW)	190.5	222.0
IV 500/230 Transformer Circuit 2 (MW)	42.7	49.7
Niland-Blythe 161 kV (MW)	8.9	20.0
Niland-Blythe 161 kV (MVAR)	0.5	3.6
IV-EI Centro SW 230 kV (MW)	164.5	208.4
IV-EI Centro SW 230 kV (MVAR)	14.3	-1.2
Mirage-Ramon 230 kV (MW)	314.9	331.7
Mirage-Ramon 230 kV (MVAR)	18.1	-14.1
Coachella-Devers 230 kV (MW)	246.0	259.8
Coachella-Devers 230 kV (MVAR)	21.6	32.2
Path 42 (MW)	557.2	587.4
Path 42 (MVAR)	-13.7	-2.3
Path 46 (MW)	6733.1	6782.8
Path 49 (MW)	5185.8	5142.4
SCIT (MW)	5979.9	6030.8

6 TRANSIENT STABILITY FINDINGS

Transient stability analysis was performed to assess impacts pertaining to the North Brawley generators. Transient voltage dips and first swing angular stability were studied to identify any stability issues. Stability analysis was performed using the heavy summer and light winter base cases. Six normal fault clearing and six backup fault clearing cases (**Appendix D**) were selected very close to the proposed generator. Monitored parameters included rotor angles, terminal or bus voltage and frequency profiles. The study found that voltage dips are within acceptable limits and the rotor angles damp adequately followed by a disturbance in the system.

6.1 Peak (heavy summer) cases

The following outages were simulated and monitored for impact at the local project bus (North Brawley) and selected regional busses for the Pre-Project and Post-Project:

Outage	Summer Pre-Project	Summer Post-Project
No Outage	Stable	Stable
Three phase fault at bus 8963 opens: NTHB RTP2 92/13.2 transformer	Not in service	Stable
Three phase fault at bus 8967 opens: NTHB RTP2 92/13.2 GPNB01 and NTHB RTP2 92/13.2 GPNB02 transformers	Not in service	Stable
Three phase fault at bus 8962 opens: NTHB RTP2 92/13.2 GPNB01, NTHB RTP2 92/13.2 GPNB02, NTHB RTP3 92/13.2 GPNB03 and NTHB RTP3 92/13.2 GPNB04 transformers plus NWSWYRD-NTHB RTP2 and NWSWYRD-NTHB RTP3 lines	Not in service	Stable
Three phase fault at bus 8970 opens: NTHB RTP2 92/13.2 GPNB01, NTHB RTP2 92/13.2 GPNB02, NTHB RTP3 92/13.2 GPNB03 and NTHB RTP3 92/13.2 GPNB04 transformers plus NWSWYRD-NTHB RTP2, NWSWYRD-NTHB RTP3, NTAP-PARKVIEW and NTAP-CALIPAT lines (Entire project)	Not in service	Stable
Three phase fault at bus 8740 opens: PARKVIEW-BRAW92	Stable	Stable
Three phase fault at bus 8697 opens: CALIPAT-CALTP2	Stable	Stable

6.2 Off-peak (light winter) Cases

Outage	Winter Pre-Project	Winter Post-Project
No Outage	Stable	Stable
Three phase fault at bus 8963 opens: NTHB RTP2 92/13.2 transformer	Not in service	Stable
Three phase fault at bus 8967 opens: NTHB RTP2 92/13.2 GPNB01 and NTHB RTP2 92/13.2 GPNB02 transformers	Not in service	Stable
Three phase fault at bus 8962 opens: NTHB RTP2 92/13.2 GPNB01, NTHB RTP2 92/13.2 GPNB02, NTHB RTP3 92/13.2 GPNB03 and NTHB RTP3 92/13.2 GPNB04 transformers plus NWSWYRD-NTHB RTP2 and NWSWYRD-NTHB RTP3 lines	Not in service	Stable
Three phase fault at bus 8970 opens: NTHB RTP2 92/13.2 GPNB01, NTHB RTP2 92/13.2 GPNB02, NTHB RTP3 92/13.2 GPNB03 and NTHB RTP3 92/13.2 GPNB04 transformers plus NWSWYRD-NTHB RTP2, NWSWYRD-NTHB RTP3, NTAP-PARKVIEW and NTAP-CALIPAT lines (Entire project)	Not in service	Stable
Three phase fault at bus 8740 opens: PARKVIEW-BRAW92	Stable	Stable
Three phase fault at bus 8697 opens: CALIPAT-CALTP2	Stable	Stable

7 SHORT CIRCUIT FINDINGS

A short circuit study and breaker capability analysis has been performed by PDS consulting, PLC. to determine the impact of the additional North Brawley generation facility to the IID Energy transmission system. The analysis found minimal impacts to the interrupting capability of the IID Energy transmission system due to the addition of the North Brawley generation facility. The analysis also found that the interrupting capability of two of the breakers, H40 and H50, at the Euclid Substation will be exceeded (the pre-Project fault levels were at 99% of the interrupting capability while the post-Project fault level was found to be 101%), however IID Energy can re-schedule to an earlier date a project to replace the affected equipment with sufficient interrupting capacity prior to the in-service date of the North Brawley project.

The results of the study also indicated that there are a few fault interrupting devices on the IID Energy system which have fault current exposure levels near of their respective interrupting ratings (specifically Imperial Valley 230kV and El Centro 92kV). However, these interrupting rating concerns have been identified as pre-existing conditions and not directly related to the North Brawley generation project.

8 SENSITIVITY SHORT CIRCUIT FINDINGS

A sensitivity analysis of to the original short circuit study and breaker capability analysis has been performed per project owner request to determine the impact of the North Brawley project phase A (6 generators in the amount of 12.5MW each) connected to the IID Energy transmission system.

The analysis found that the fault duty at the Euclid 92 kV substation will exceed the interrupting capability of two of the breakers, H40 and H50, at this substation (the pre-Project fault levels were at 98.4% of the interrupting capability while the post-Project fault level was found to be 100.04%). Even though these short circuit violations are marginal, the IID standard requires the replacement of these breakers once they reach their interrupting capability.

9 POST-TRANSIENT STABILITY FINDINGS

Imperial Irrigation District (IID) has contracted PDS consulting, PLC (PDS) to perform a post-transient power flow analysis including reactive power margin test for the integration of the North Brawley Generation Project to the IID energy system. The scope of the post-transient analysis is to determine the impact caused solely by the addition the North Brawley generation project to the IID Energy transmission system during the post-transient time frame.

9.1 Post-transient Power Flow Analysis

Post-transient power flow analysis was performed on both the pre-project and post-project base cases for the 2010 heavy summer and 2010 light winter operating conditions. The two base cases were used to simulate the impact of the North Brawley Project during single (N-1) as well as multiple contingencies. The N-1 and selected multiple contingencies simulated included:

- All single (92-230 kV) transmission circuit outages within the vicinity of the project
- All single transformer outages within the vicinity of the project
- Selected outages of double circuit tower lines (92-230 kV) within the vicinity of the project.

The contingency lists for the post-transient analysis can be found in Appendix C.

The WECC/NERC standard was used to assess the adequacy of the study results. The post-transient analysis related evaluation criteria used are:

- Maximum voltage deviations allowed at all buses in the post-transient time frame will be 5% for N-1 and 10% for N-2 unless a lower standard has been previously adopted on selected buses. Southern California Edison (SCE) allows a lower standard of 7% post-transient voltage deviation for N-1 contingencies. Table 1 also provides a summary of the WECC/NERC post-transient deviation standard.

9.2 Post-transient Reactive Power Margin

Post-transient reactive power margin analysis was performed on selected buses in the IID transmission system following selected critical outages. This analysis was performed using the 2010 pre- and post-project base cases. The list outages simulated and the buses monitored are provided below.

- N. Laquinta-Avenue 42 92 kV line outage
- Imperial Valley-Miguel 500 kV line outage
- Palo Verde-Devers 500 kV line outage
- N. Gila-Imperial Valley 500 kV line outage
- Imperial Valley-Elcentro 230 kV line outage
- ELSTM2 and REPU2 generator outages

The monitored buses included:

- Avenue 58 161 kV
- Coachella Valley 161 kV
- N. Laquinta 92 kV
- Coachella Valley 92 kV
- Midway 92 kV
- Niland 92 kV
- Elcentro 92 kV
- Calexico 92 kV
- Pilot Knob 92 kV
- Dixieland 92 kV

The post-transient reactive power margin analysis evaluated criteria used are:

- Minimum reactive power margin at any bus following N-1 outage is 100 Mvar
- Minimum reactive power margin at any bus following N-2 outage is 50 Mvar.

Table 1: WECC/NERC Post-Transient and Stability Analysis Evaluation Criteria

NERC and WECC Categories	Outage Frequency Associated with the Performance Category (outage/year)	Transient Voltage Dip Standard	Minimum Transient Frequency Standard	Post Transient Voltage Deviation Standard
A System normal	Not Applicable	Nothing in addition to NERC		
B One element out-of-service	≥ 0.33	Not to exceed 25% at load buses or 30% at non-load buses. Not to exceed 20% for more than 20 cycles at load buses.	Not below 59.6Hz for 6 cycles or more at a load bus.	Not to exceed 5% at any bus.
C Two or more elements out-of-service	0.033 – 0.33	Not to exceed 30% at any bus. Not to exceed 20% for more than 40 cycles at load buses.	Not below 59.0Hz for 6 cycles or more at a load bus.	Not to exceed 10% at any bus.
D Extreme multiple-element outages	< 0.033	Nothing in addition to NERC		

9.3 POST TRANSIENT POWER FLOW STUDY RESULTS

Post-transient power flow solutions were achieved for most of the outages studied using both the 2010 heavy summer and 2010 light winter base cases. Two multiple outages however did not result in post-transient solution using both the 2010 heavy summer and 2010 light winter pre- and post-project base cases. These outages are:

- Coachella-Devers and Coachella-Ramon 230 kV lines (without RAS)
- Ramon-Mirage and Coachella-Devers 230 kV lines (without RAS)

Post-transient power flow solutions were however achieved by implementing the RAS associated with the above outages. In particular, to achieve a post-transient power flow solution following the simultaneous outages of Coachella-Devers and Coachella-Ramon 230 kV lines, about 120 MW of generation were tripped at the collector system connected to Midway 92 kV substation.

Several bus voltage deviation violations were recorded following selected N-1 outages using the 2010 heavy summer pre- and post-project base cases. However, only one bus voltage deviation violation at the Deseret Shores 92 kV bus was due to the addition of the North Brawley Project.

The following sections provide details of the post-transient power flow findings for each of the operating condition evaluated.

9.3.1 Heavy Summer 2010 Base Case

A summary of the post-transient power flow study results is provided in Appendix A. Key post-transient power flow findings from the studies performed using the 2010 heavy summer base case are:

- Post-transient power flow solutions were obtained for all the N-1 outages simulated using both the pre- and post-project base cases.
- Several bus voltage deviation violations were recorded following selected N-1 outages during the 2010 heavy summer operating condition. The majority of the bus voltage deviation violations recorded were not due to the addition of the North Brawley Project.
- Coachella-Devers and Coachella-Ramon 230 kV lines (without RAS) did not result in post-transient power flow solution using both pre- and post-project base cases. Post-transient solution was obtained by tripping up to 120 MW of generation connected to the Midway 92 kV substation collector systems following the outages.
- Coachella-Devers and Ramon-Mirage 230 kV lines (without RAS) did not result in post-transient power flow solution using both pre- and post-project base cases. Post-transient solution was obtained by the implementation of the Path 42 RAS (416.2 MW of IID's internal generation reduction)
- No post-transient bus voltage deviation violations were recorded following any of the multiple outages simulated.

9.3.2 Light Winter 2010 Base Case

Post-transient power flow solutions were obtained for all the N-1 outages. Two multiple outages did not result in post-transient power flow solution without RAS:

- Coachella-Devers and Coachella-Ramon 230 kV lines (without RAS)
- Ramon-Mirage and Coachella-Devers 230 kV lines (without RAS)

Solutions were obtained with implementation of the RAS associated with the outages. No bus voltage deviation violation was recorded for all the outages studied using the 2010 light autumn base case.

9.4 POST-TRANSIENT REACTIVE POWER MARGIN STUDY RESULTS

A summary of the post-transient reactive power margin analysis can be found at Appendix B. Positive reactive power margins were obtained at all the buses monitored following the selected outages.

The addition of the North Brawley Project did not impact the existing reactive power margins at the selected buses for all the outages with the exception of the Imperial Valley –Miguel 500 kV line outage. An outage of the Imperial Valley-Miguel 500 kV line caused the reactive power margin at five (5) buses to decrease up to 4 MVar. In particular, the addition of the North Brawley Project and the subsequent outage of the Imperial Valley –Miguel 500 kV line caused the reactive power margin at North La Quinta 92 kV bus to decrease from 103 Mvar to 99 Mvar.

10. CONCLUSIONS

During the development of the North Brawley System Impact Study the IID System Planning team found the following system impacts attributable solely to the interconnection of the 150 MW project. In addition, the North Brawley Plant will need to participate in coordination with the IID System Operator in mitigating other system violations not solely attributable to this Project in order to maintain the IID System reliability:

Heavy Summer (Pre & Post-Project Cases)

N-1 Condition:

- Thermal Rating Violations

The outage of Coachella Valley-Jackson (CW) 92 kV Line overloaded the Avenue 58 161/92 kV Bank #1 above its normal rating of 125 MVA (101.6%) while having the Project generating at 150 MW.

Two alternatives were selected to mitigate the violation; a) A temporary solution would be to implement a System Operating Procedure (SOP) which would require reduction of the North Brawley MW generation output up to the point that the loading on the Ave.58 Bank #1 becomes below their normal rating. The first priority for reduction will be on the 50 MW (Export) scheduled to SCE, the second priority would be on the 50 MW serving IID load. b) A permanent solution to avoid affecting the Project MW output is, to replace the Ave. 58 Bank #1 with a higher capacity bank. This would represent to set ahead the in service date for a project to replace such bank with a new 300 MVA bank.

The outage of Avenue 58-Oasis (R) 92 kV Line overloaded the Avenue 58 161/92 kV Bank #1 above its normal rating of 125 MVA (100.6%) while having the Project generating at 150 MW.

Two alternatives were selected to mitigate the violation; a) A temporary solution would be to implement an Operating Procedure which would require reduction of the North Brawley MW generation output up to the point that the loading on these Ave.58 Bank #1 becomes below their normal rating. The first priority for reduction will be on the 50 MW (Export) scheduled to SCE, the second priority would be on the 50 MW serving IID load. b) A permanent solution to avoid affecting the Project MW output is, to replace the Ave. 58 Bank #1 with a higher capacity bank. This would represent to set ahead the in service date for a project to replace such bank with a new 300 MVA bank.

The outage of Avenue 58 161/92 kV Transformer Bank #1 overloaded the Coachella Valley 161/92 kV Transformer Bank #3 above its normal rating of 125 MVA (103.3%) while having the Project generating at 150 MW.

Two alternatives were selected to mitigate the violation; a) A temporary solution would be to implement an Operating Procedure which would require reduction of the North Brawley MW generation output up to the point that the loading on these CV Bank #3 becomes below their normal rating. The first priority for reduction will be on the 50 MW (Export) scheduled to SCE, the second priority would be on the 50 MW serving IID load. b) A permanent solution to avoid affecting the Project MW output is, to replace the Coachella Valley 161/92 kV Transformer Bank #3 with a higher capacity bank.

- Voltage Deviation Violations

The outage of Avenue 58-Oasis 92 kV (R) Line created a voltage deviation violation of +5.1% at the Salton City 92 kV bus while having the Project generating at 150 MW.

Two alternatives were selected to mitigate the violation; a) A temporary solution would be to implement an Operating Procedure which would include adjustment of the North Brawley MVAR generation output up to the point that the Salton City 92 kV bus voltage become within a normal range of 0.95-1.05 p.u. or, b) A permanent mitigating solution would be to implement a Special Protection Scheme (SPS) which would trip a 4.8 MVAR capacitor bank of Desert Shores substation with the outage of Avenue 58-Oasis 92 kV (R) Line, simultaneously. In reality, the extremes of the "R" Line to trip are at Avenue 58 and Desert Shores Substations.

N-2 Condition:

- Thermal Rating Violations

No Thermal Rating violations attributable to the Project were found in the IID transmission system

- Voltage Deviation Violations

No Voltage Deviation violations attributable to the Project were found in the IID transmission system. Also, in order to eliminate pre-existing voltage issues in the Coachella Valley zone due to the same outage, IID will need to continue implementing its Transmission Expansion Plan to mitigate a few pre-existing voltage deviation violations.

Light Winter (Pre & Post-Project Cases)

N-1 Condition:

- Thermal Rating Violations

The outage of El Centro-Imperial Valley 230kV (S) Line overloaded the El Centro 161/92 kV Transformer Bank #2 to 107.8% of its normal rating of 125 MVA while having the Project generating at 150 MW.

Two alternatives were selected to mitigate the violation; a) A temporary solution would be to implement an Operating Procedure which will require reduction of the North Brawley MW generation output up to the point that the loading on the El Centro 161/92 kV Transformer Bank #2 becomes below their normal rating. The first priority for reduction will be on the 50 MW (Export) scheduled to SCE, the second priority would be on the 50 MW serving IID load. b) A permanent solution to avoid affecting the Project MW output is, to upgrade of the EC Bank #2 to a larger capacity bank.

- Voltage Deviation Violations

No Voltage Deviation violations attributable to the Project were found in the IID transmission system.

N-2 Condition:

- Thermal Rating Violations

No Thermal Rating violations attributable to the Project were found in the IID transmission system.

- Voltage Deviation Violations

No Voltage Deviation violations attributable to the Project were found in the IID transmission system.

In summary, the mitigations for thermal rating and/or voltage deviation violations attributable to the Project will require to prepare and implement a few System Operating Procedures (SOPs) to resolve temporarily the violations, however in order to resolve permanently those violations, it is recommended to implement the described system upgrades before the in-service date of North Brawley project besides continuing with the implementation of the IID Transmission Expansion Plan.

The revision to the RAS description is necessary to include 50% of the net North Brawley plant output into the scheme which represent 50 MW since the outage of Path 42 (Ramon-Mirage & CV-Devers 230 kV) together with the RAS creates a voltage deviation violation at a few buses in the IID system. With the addition of the North Brawley project, the RAS will also include the simultaneous tripping of the Midway 92kV and Highline 92 kV 24.5 MVAR Capacitor Banks with the RAS operation. This is a task required within the SOPs preparation since this project exacerbates the operating condition for certain contingencies that overloaded Path 42. This would represent additional studies to be performed by IID to determine and document the sequence of mitigating actions to be taken by the System and Plant Operators when any of the mentioned critical outages occurs. This additional study work was not part of the scope of work for this system impact study.

In addition, pre-existing thermal and voltage violations under outage condition not included in this report were considered not attributable to the Project and are being addressed by IID in other planning forums.

This System Impact Study considered that there were no schedule capabilities available to deliver the North Brawley generation power to SCE through path 42, since as of today the scheduled capacity of this path is fully subscribed. It will require a Path 42 Rating Upgrade Study among the SCE and IID.

Transient Stability

Stability analysis indicated that the addition of the Project does not adversely impact the stability response of the system. On stability outages of the generator transformers, it has been noted that both, the generator and transformer must be tripped simultaneously. Generation tripping for the loss of the step-up transformer is a common practice and does not represent any additional problem to the IID system.

Short Circuit

The analysis found minimal impacts to the interrupting capability of the IID Energy transmission system due to the addition of the North Brawley generation facility. The analysis also found that the interrupting capability of two of the breakers, H40 and H50, at the Euclid Substation will be exceeded (the pre-Project fault levels were at 99% of the interrupting capability while the post-Project fault level was found to be 101%), however IID Energy can re-schedule to an earlier date a project to replace the affected equipment with sufficient interrupting capacity prior to the in-service date of the North Brawley project. The replacement of the two breakers with higher interrupting capability is required before connecting the project to the IID system.

Sensitivity Short Circuit

A sensitivity analysis of to the original short circuit study and breaker capability analysis has been performed per project owner request to determine the impact of the North Brawley project phase A (6 generators in the amount of 12.5MW each) connected to the IID Energy transmission system.

The analysis found that the fault duty at the Euclid 92 kV substation will exceed the interrupting capability of two of the breakers, H40 and H50, at this substation (the pre-Project fault levels were at 98.4% of the

interrupting capability while the post-Project fault level was found to be 100.04%). Even though these short circuit violations are marginal, the IID standard requires the replacement of these breakers once they reach their interrupting capability.

Post-Transient Stability Analysis

The addition of the North Brawley Project did not impact the existing reactive power margins at selected buses for all the outage simulation studied with the exception of the Imperial Valley –Miguel 500 kV line outage. An outage of the Imperial Valley-Miguel 500 kV line caused the reactive power margin at five (5) IID buses to decrease up to 4 MVAR. In particular, the addition of the North Brawley Project and the subsequent outage of the Imperial Valley –Miguel 500 kV line caused the reactive power margin at N. LAQUITA 92 kV bus to decrease from 103 Mvar to 99 Mvar, this does not represent a limitation and does not required a mitigation.

**North Brawley
System Impact Study**



**Appendix A
Contingency list**

#N-1 Contingency File

```
# Contingency Selection Criteria: From area 8 to 8; 92 kV to 230 kV
# Contingency Selection Criteria: From area 8 to 8; 92 kV to 230 kV
# Modified contingency line_80a - Siri (KEMA) - 07-26-07
# Added contingency line_80b - Siri (KEMA) - 07-26-07
# Combined line_80a and line_80b. Removed line_80b - Siri (KEMA) - 07-03-07
# Fixed Line_71 line "PRUETTAP 92.00" "HIGHLINE 92.00" - Elizondo (KEMA) -
07-05-07
# Commented out Line_222 as line no longer exists. Elizondo (KEMA by IID email
July 16) - 07-16-07
# Add Contingencies (tran_282, tran_283, line_284, line_285) at the end of file
Elizondo (KEMA by IID email July 17) - 07-16-07
line_1 "Line YUCCA161 161.0 to PILOTKNB 161.0 Circuit 1"
line "YUCCA161 161.00" "PILOTKNB 161.00" "1 " 1 0
tran "8122" "84846" "1" 0
tran "8122" "84846" "2" 0
tran "YUCCA161 161.00" "YUCCGT21 13.8" "1" 0
gen "YUCCGT21 13.80" "1 " 0
epcl "redispatch.p"
0
line_2 "Line CVSUB 92.0 to COACHELA 92.0 Circuit 1"
line "CVSUB 92.00" "COACHELA 92.00" "1 " 1 0
0
line_3 "Line CVSUB 92.0 to COACHELA 92.0 Circuit 2"
line "CVSUB 92.00" "COACHELA 92.00" "2 " 1 0
0
line_4 "Line CVSUB 92.0 to JACKSON 92.0 Circuit 1"
line "CVSUB 92.00" "JACKSON 92.00" "1 " 1 0
0
line_5 "Line CVSUB 92.0 to COLMAC 92.0 Circuit 1"
line "CVSUB 92.00" "COLMAC 92.00" "1 " 1 0
tran "COLMAC 92.00" "COLMAC 13.80" "1 " 0
gen "COLMAC 13.80" "1 " 0
epcl "redispatch.p"
0
line_6 "Line AVE58 92.0 to JEFERSN 92.0 Circuit 1"
line "AVE58 92.00" "JEFERSN 92.00" "1 " 1 0
0
line_7 "Line AVE58 92.0 to COACHELA 92.0 Circuit 1"
line "AVE58 92.00" "RTAP8 92.00" "1 " 1 0
line "RTAP8 92.00" "COACHELA 92.00" "1 " 1 0
0
line_8 "Line AVE58 92.0 to OASIS 92.0 Circuit 1"
line "AVE58 92.00" "RTP6OASS 92.00" "1 " 1 0
line "DSTSHRS 92.00" "RTP6OASS 92.00" "1 " 1 0
line "OASIS 92.00" "RTP6OASS 92.00" "1 " 1 0
load "OASIS 92.00" "1 " 0
shunt "OASIS 92.00" "b" 0
0
line_9 "Line USNAF 92.0 to DIXIELAN 92.0 Circuit 1"
line "USNAF 92.00" "DIXIELAN 92.00" "1 " 1 0
0
line_10 "Line USNAF 92.0 to ELTERMIN 92.0 Circuit 1"
line "USNAF 92.00" "ELTERMIN 92.00" "1 " 1 0
0
line_11 "Line JEFERSN 92.0 to MARSHALL 92.0 Circuit 1"
line "JEFERSN 92.00" "MARSHALL 92.00" "1 " 1 0
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0
line_12      "Line LAQUINTA  92.0 to N.LAQUIN  92.0 Circuit 1"
line "LAQUINTA 92.00" "N.LAQUIN  92.00" "1 " 1 0
0
line_13      "Line LAQUINTA  92.0 to MARSHALL  92.0 Circuit 1"
line "LAQUINTA 92.00" "MARSHALL  92.00" "1 " 1 0
0
line_14      "Line N.VIEW     92.0 to AVE42     92.0 Circuit 1"
line "N.VIEW   92.00" "AVE42     92.00" "1 " 1 0
0
line_15      "Line N.VIEW     92.0 to RAMON92   92.0 Circuit 1"
line "N.VIEW   92.00" "RAMON92   92.00" "1 " 1 0
0
line_16      "Line AVE48     92.0 to SHIELDS   92.0 Circuit 1"
line "AVE48    92.00" "CWTAP2    92.00" "1 " 1 0
line "CWTAP2   92.00" "SHIELDS   92.00" "1 " 1 0
0
line_17      "Line N.LAQUIN  92.0 to AVE42     92.0 Circuit 1"
line "N.LAQUIN 92.00" "AVE42     92.00" "1 " 1 0
0
line_18      "Line NILAND    92.0 to NEW MECCA  92.0 Circuit 1"
line "BOMBAY   92.00" "NORTHSHR  92.00" "1 " 1 0
line "NEWMECCA 92.00" "NORTHSHR  92.00" "1 " 1 0
line "NILAND   92.00" "LIB XX    92.00" "1 " 1 0
line "LIB XX   92.00" "BOMBAY    92.00" "1 " 1 0
load "NORTHSHR 92.00"          "1 " 0
load "BOMBAY   92.00"          "1 " 0
shunt "BOMBAY  92.00"          "b" 0
0
line_19      "Line COACHELA  92.0 to VANBUREN  92.0 Circuit 1"
line "COACHELA 92.00" "CITAP1    92.00" "1 " 1 0
line "CITAP1   92.00" "VANBUREN  92.00" "1 " 1 0
0
line_20      "Line CARREON   92.0 to JACKSON   92.0 Circuit 1"
line "CARREON  92.00" "CITP4     92.00" "1 " 1 0
line "CITP4    92.00" "CITP2     92.00" "1 " 1 0
line "CITP2    92.00" "JACKSON   92.00" "1 " 1 0
0
line_21      "Line CARREON   92.0 to MONROE   92.0 Circuit 1"
line "CARREON  92.00" "MONROE    92.00" "1 " 1 0
0
line_22      "Line SKY VLY   92.0 to COACHELA   92.0 Circuit 1"
line "SKY VLY  92.00" "CMTAP1    92.00" "1 " 1 0
line "CMTAP1   92.00" "COACHELA  92.00" "1 " 1 0
load "SKY VLY  92.00"          "1 " 0
0
line_23      "Line SHAHILLS  92.0 to VANBUREN  92.0 Circuit 1"
line "SHAHILLS 92.00" "CMTAP2    92.00" "1 " 1 0
line "CMTAP2   92.00" "VANBUREN  92.00" "1 " 1 0
0
line_24      "Line AVE42     92.0 to SHIELDS   92.0 Circuit 1"
line "AVE42    92.00" "SHIELDS   92.00" "1 " 1 0
0
line_25      "Line AVE42     92.0 to FRANWAY   92.0 Circuit 1"
line "AVE42    92.00" "FRANWAY   92.00" "1 " 1 0
0
line_26      "Line FRANWAY   92.0 to EDOM     92.0 Circuit 1"

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line "FRANWAY 92.00" "EDOM 92.00" "1 " 1 0
0
line_27 "Line AVE42 92.0 to MONROE 92.0 Circuit 1"
line "AVE42 92.00" "MONROE 92.00" "1 " 1 0
0
#line_28 "Line COACHELA 230.0 to RAMON230 230.0 Circuit 1"
# line "COACHELA 230.00" "RAMON230 230.00" "1 " 1 0
#0
line_28b "Line COACHELA 230.0 to INDIAN HILLS 230.0 Circuit 1"
line "COACHELA 230.00" "8002" "1 " 1 0
0
line_29 "Line COACHELA 230.0 to MIDWAY 230.0 Circuit 1"
line "8311" "8699" "1 " 1 0
0
line_30 "Line COACHELA 230.0 to MIDWAY 230.0 Circuit 2"
line "8311" "8699" "2 " 1 0
0
line_31 "Line COACHELA 230.0 to DEVERS 230.0 Circuit 1"
line "COACHELA 230.00" "DEVERS 230.00" "1 " 1 0
0
line_32 "Line COACHELA 92.0 to AVE 52 92.0 Circuit 1"
line "COACHELA 92.00" "AVE 52 92.00" "1 " 1 0
0
line_33 "Line DIXIELAN 92.0 to DIXPRI 92.0 Circuit 1"
line "DIXIELAN 92.00" "DIXPRI2 92.00" "1 " 1 0
line "DIXPRI2 92.00" "DIXPRI 92.00" "1 " 1 0
0
line_34 "Line DIXIELAN 92.0 to SUPERSTITION 92.0 Circuit 1"
line "DIXIELAN 92.00" "SUPERSTI 92.00" "1 " 1 0
0
line_35 "Line DROP4 92.0 to DROP2 92.0 Circuit 1"
line "DROP4 92.00" "DROP2 92.00" "1 " 1 0
tran "8321" "8659" "1 " 0
gen "DROP2 6.90" "1 " 0
epcl "redispatch.p"
0
line_36 "Line DROP3 92.0 to DROP4 92.0 Circuit 1"
line "DROP3 92.00" "DROP4 92.00" "1 " 1 0
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line_37 "Line DROP4 92.0 to BRAVO 92.0 Circuit 1"
line "DROP4 92.00" "BRAVO 92.00" "1 " 1 0
0
line_38 "Line DROP4 92.0 to PILOTKNB 92.0 Circuit 1"
line "DROP4 92.00" "PILOTKNB 92.00" "1 " 1 0
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line_39 "Line ELSTEAMP 92.0 to DROP4 92.0 Circuit 1"
line "ELSTEAMP 92.00" "ORMAT92 92.00" "1 " 1 0
line "ORMAT92 92.00" "DROP4 92.00" "1 " 1 0
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line_40 "Line EDOM 92.0 to RAMON92 92.0 Circuit 1"
line "EDOM 92.00" "RAMON92 92.00" "1 " 1 0
0
line_41 "Line ELCENTSW 161.0 to PILOTKNB 161.0 Circuit 1"
line "ELCENTSW 161.00" "PILOTKNB 161.00" "1 " 1 0
0
line_42 "Line ELCENTSW 230.0 to IMPRLVLY 230.0 Circuit 1"
line "ELCENTSW 230.00" "IMPRLVLY 230.00" "1 " 1 0

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0
line_43      "Line ELSTEAMP 92.0 to ELTERMIN 92.0 Circuit 1"
line "ELSTEAMP 92.00" "ELTERMIN 92.00" "1 " 1 0
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line_44      "Line ELSTEAMP 92.0 to ELTERMIN 92.0 Circuit 2"
line "ELSTEAMP 92.00" "ELTERMIN 92.00" "2 " 1 0
0
line_45      "Line ELSTEAMP 92.0 to HEBERSCE 92.0 Circuit 1"
line "ELSTEAMP 92.00" "HEBERSCE 92.00" "1 " 1 0
0
line_46      "Line ELSTEAMP 92.0 to HOLTVILL 92.0 Circuit 1"
line "ELSTEAMP 92.00" "HOLTVILL 92.00" "1 " 1 0
0
line_47      "Line ELSTEAMP 92.0 to CLARK 92.0 Circuit 1"
line "ELSTEAMP 92.00" "CLARK 92.00" "1 " 1 0
0
line_48      "Line ELSTEAMP 92.0 to Rockwood 92.0 Circuit 2"
line "ELSTEAMP 92.00" "WSTBIOTP 92.00" "2 " 1 0
line "WSTBIOTP 92.00" "ROCKWOOD 92.00" "2 " 1 0
line "WSTBIOTP 92.00" "WESTBIO 92.00" "1 " 1 0
tran "WESTBIO 92.00" "WPOWER#2 13.80" "1 " 0
gen "WPOWER#2 13.80" "1 " 0
epcl "redispatch.p"
0
line_49      "Line ELSTEAMP 92.0 to ATEN 92.0 Circuit 1"
line "ELSTEAMP 92.00" "ATEN 92.00" "1 " 1 0
0
line_50      "Line ELSTEAMP 92.0 to PRUETT 92.0 Circuit 1"
line "ELSTEAMP 92.00" "PRUETT 92.00" "1 " 1 0
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line_51      "Line ELSTEAMP 92.0 to IMPERIAL 92.0 Circuit 1"
line "ELSTEAMP 92.00" "IMPERIAL 92.00" "1 " 1 0
0
line_52      "Line ELSTEAMP 92.0 to CENTRAL 92.0 Circuit 1"
line "ELSTEAMP 92.00" "CENTRAL 92.00" "1 " 1 0
0
line_53      "Line ELTERMIN 92.0 to EUCLID 92.0 Circuit 1"
line "ELTERMIN 92.00" "EUCLID 92.00" "1 " 1 0
0
line_54      "Line EUCLID 92.0 to DAHLIA 92.0 Circuit 1"
line "EUCLID 92.00" "DAHLIA 92.00" "1 " 1 0
0
line_55      "Line HEBERSCE 92.0 to PERRY 92.0 Circuit 1"
line "HEBERSCE 92.00" "PERRY 92.00" "1 " 1 0
0
line_56      "Line HOLTVILL 92.0 to ATEN 92.0 Circuit 1"
line "HOLTVILL 92.00" "ATEN 92.00" "1 " 1 0
0
line_57      "Line CLARK 92.0 to DAHLIA 92.0 Circuit 1"
line "CLARK 92.00" "DAHLIA 92.00" "1 " 1 0
0
line_58      "Line NEW MECCA to AVE 52 92.0 Circuit 1"
line "NEWMECCA 92.00" "KTP2 92.00" "1 " 1 0
line "KTP2 92.00" "THERMAL 92.00" "1 " 1 0
line "THERMAL 92.00" "AVE 52 92.00" "1 " 1 0
load "THERMAL 92.00" "1 " 0
shunt "THERMAL 92.00" "b " 0

```

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0
line_59      "Line NILAND 161.0 to CVSUB161 161.0 Circuit 1"
line "NILAND 161.00" "CVSUB161 161.00" "1 " 1 0
0
line_60      "Line NILAND 161.0 to BLYTHE 161.0 Circuit 1"
line "NILAND 161.00" "BLYTHE 161.00" "1 " 1 0
0
line_61      "Line BRAVO 92.0 to PERRY 92.0 Circuit 1"
line "BRAVO 92.00" "PERRY 92.00" "1 " 1 0
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line_62      "Line BRAVO 92.0 to CLX92 92.0 Circuit 1"
line "BRAVO 92.00" "CLX92 92.00" "1 " 1 0
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line_63      "Line NILAND 92.0 to PRISON 92.0 Circuit 1"
line "NILAND 92.00" "PRITP1 92.00" "1 " 1 0
line "PRITP1 92.00" "PRISON 92.00" "1 " 1 0
0
line_64      "Line PERRY 92.0 to PRUETT 92.0 Circuit 1"
line "PERRY 92.00" "PRUETT 92.00" "1 " 1 0
0
line_65      "Line ROCKWOOD 92.0 to BRAW92 92.0 Circuit 1"
line "ROCKWOOD 92.00" "BRAW92 92.00" "1 " 1 0
0
line_66      "Line DIXIEPRISON 92.0 to CENTRAL 92.0 Circuit 1"
line "DIXPRI 92.00" "DIXPRI1 92.00" "1 " 1 0
line "DIXPRI1 92.00" "RTAP1 92.00" "1 " 1 0
line "RTAP1 92.00" "CENTRAL 92.00" "1 " 1 0
0
line_67      "Line ANZA 92.0 to DESERT SHORES 92.0 Circuit 1"
line "ANZA 92.00" "SALTCITY 92.00" "1 " 1 0
line "SALTCITY 92.00" "DSTSHRS 92.00" "1 " 1 0
load "SALTCITY 92.00" "1 " 0
0
line_68      "Line CLX92 92.0 to MALL 92.0 Circuit 1"
line "CLX92 92.00" "MALL 92.00" "1 " 1 0
0
line_69      "Line ELSTEAMP 92.0 to MALL 92.0 Circuit 1"
line "ELSTEAMP 92.00" "MALL 92.00" "1 " 1 0
0
line_70      "Line CALIPAT 92.0 to PRISON 92.0 Circuit 1"
line "CALIPAT 92.00" "CALPTTAP 92.00" "1 " 1 0
line "CALPTTAP 92.00" "PRITP2 92.00" "1 " 1 0
line "PRITP2 92.00" "PRISON 92.00" "1 " 1 0
0
line_71      "Line PRUETTAP 92.0 to HIGHLINE 92.0 Circuit 1"
line "PRUETTAP 92.00" "HIGHLINE 92.00" "1 " 1 0
line "PRUETTAP 92.00" "SIGCTAP 92.00" "1 " 1 0
line "SIGCTAP 92.00" "SIGC92 92.00" "1 " 1 0
shunt "SIGC92 92.00" "b " 0
load "ORCAL 13.8" "1 " 0
tran "SIGC92 92.00" "SIGC13.8 13.80" "1" 0
tran "SIGC92 92.00" "ORCAL 13.80" "1 " 0
gen "SIGC13.8 13.80" "1 " 0
gen "ORCAL 13.80" "1 " 0
epcl "redispatch.p"
0
line_72      "Line HIGHLINE 230.0 to MIDWAY 230.0 Circuit 1"

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line "8690" "8699" "1 " 1 0
0
line_73 "Line HIGHLINE 230.0 to MIDWAY 230.0 Circuit 2"
line "8690" "8699" "2 " 1 0
0
line_74 "Line HIGHLINE 92.0 to GEM23 92.0 Circuit 2"
line "HIGHLINE 92.00" "GEM23 92.00" "2 " 1 0
line "GEM92 92.00" "GEM23 92.00" "2 " 1 0
line "GEM23 92.00" "ORM2 92.00" "2 " 1 0
line "ORM2 92.00" "ORM1 92.00" "2 " 1 0
line "ORM12 13.80" "ORM1E 13.80" "1 " 1 0
line "ORM12 13.80" "ORM1H 13.80" "1 " 1 0
tran "ORM1H 13.80" "ORM1HG 00.60" "1 " 0
tran "ORM1H 13.80" "ORM1HM 00.48" "1 " 0
tran "ORM1E 13.80" "ORM1EG 00.60" "1 " 0
tran "ORM1E 13.80" "ORM1EM 00.48" "1 " 0
tran "ORM11 13.80" "ORM11M 00.48" "1 " 0
tran "ORM11 13.80" "ORM11G 00.60" "1 " 0
tran "ORM1 92.00" "ORM11 13.80" "2 " 0
tran "ORM1 92.00" "ORM12 13.80" "2 " 0
tran "GEM92 92.00" "GEM2 13.80" "2 " 0
tran "GEM92 92.00" "GEM3 13.80" "2 " 0
shunt "GEM92 92.00" "b " 0
shunt "ORM1 92.00" "b " 0
shunt "ORM2 92.00" "b " 0
load "8914" "1 " 0
load "8913" "1 " 0
load "8904" "1 " 0
load "GEM2 13.80" "1 " 0
gen "GEM3 13.80" "1 " 0
gen "GEM2 13.80" "2 " 0
gen "GEM2 13.80" "1 " 0
gen "ORM11M 0.48" "1 " 0
gen "ORM11G 0.60" "1 " 0
gen "ORM1EM 0.48" "1 " 0
gen "ORM1EG 0.60" "1 " 0
gen "ORM1HM 0.48" "1 " 0
gen "ORM1HG 0.60" "1 " 0
epcl "redispatch.p"
0
line_75 "Line RAMON230 230.0 to MIRAGE 230.0 Circuit 1"
line "RAMON 230.00" "MIRAGE 230.00" "1 " 1 0
0
line_76 "Line AVE42 92.0 to SHAHILLS 92.0 Circuit 1"
line "AVE42 92.00" "SHAHILLS 92.00" "1 " 1 0
0
line_77 "Line CALIPAT 92.0 to BEEFPLNT 92.0 Circuit 1"
line "CALIPAT 92.00" "CALTP2 92.00" "1 " 1 0
line "CALTP2 92.00" "BEEFPLNT 92.00" "1 " 1 0
0
line_78 "Line MIDWAY 92.0 to MINPLNT 92.0 Circuit 1"
line "MIDWAY 92.00" "MINPLNT 92.00" "1 " 1 0
line "MINPLNT 92.00" "UNIT5 92.00" "1 " 1 0
line "UNIT5 92.00" "DESRT5L 13.80" "1 " 1 0
tran "UNIT5 92.00" "UNIT5L 13.80" "1 " 0
tran "DESRT5L 92.00" "DPWR#3 13.80" "1 " 0
gen "UNIT5L 13.80" "1 " 0

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gen "DPWR#3    13.80"           "1 "    0
epcl "redispatch.p"
0
line_79      "Line MIDWAY    92.0 to VULCAN    92.0 Circuit 1"
line "MIDWAY    92.00" "VULCAN    92.00" "1 " 1 0
line "VULCAN    92.00" "EARTHE2   92.00" "1 " 1 0
line "EARTHE2   92.00" "REGLEX    92.00" "1 " 1 0
tran "VULCAN    92.00" "VULCAN1  14.40" "1 " 0
tran "REGLEX    92.00" "SALTSEA4 13.80" "1 " 0
gen "VULCAN1   14.40" "1 " 0
gen "VULCAN1   14.40" "2 " 0
gen "EARTHE2   92.00" "1 " 0
gen "SALTSEA4  13.80" "1 " 0
epcl "redispatch.p"
0
line_80a     "Line PARKVIEW  92.0 to NBTAP    92.0 Circuit 1"
line "PARKVIEW  92.00" "NBTAP    92.00" "1 " 1 0
0
line_80b     "Line CALIPAT   92.0 to NBTAP    92.0 Circuit 1"
line "CALIPAT   92.00" "NBTAP    92.00" "1 " 1 0
0
line_80c     "Line NORTH BRAWLEY SWYRD 92.0 to NTHB RTP2  92.0 Circuit 1"
line "NBSWYRD   92.00" "NTHB RTP2 92.00" "1 " 1 0
0
line_80d     "Line NORTH BRAWLEY SWYRD 92.0 to NTHB RTP3  92.0 Circuit 1"
line "NBSWYRD   92.00" "NTHB RTP3 92.00" "1 " 1 0
0
tran_80e     "NTHB RTP2 92.0 to GPNB02 13.2"
tran "NTHB RTP2 92.00" "GPNB02 13.2" "1 " 0
0
tran_80f     "NTHB RTP3 92.0 to GPNB04 13.2"
tran "NTHB RTP3 92.00" "GPNB04 13.2" "1 " 0
0
line_81      "Line AV58      161.0 to ELCENTSW 161.0 Circuit 1"
line "AV58      161.00" "AV58TP1  161.00" "1 " 1 0
line "AV58TP1  161.00" "ELCENTSW  161.00" "1 " 1 0
0
line_82      "Line AV58      161.0 to CVSUB   161.0 Circuit 1"
line "AV58      161.00" "AV58TP2  161.00" "1 " 1 0
line "AV58TP2  161.00" "CVSUB161 161.00" "1 " 1 0
0
line_83      "Line IMPERIAL  92.0 to PANNO    92.0 Circuit 1"
line "IMPERIAL  92.00" "PANNO    92.00" "1 " 1 0
0
line_84      "Line BRAW92    92.0 to PARKVIEW  92.0 Circuit 1"
line "BRAW92    92.00" "PARKVIEW  92.00" "1 " 1 0
0
line_85      "Line BRAW92    92.0 to PANNO    92.0 Circuit 1"
line "BRAW92    92.00" "PANNO    92.00" "1 " 1 0
0
line_86      "Line BRAW92    92.0 to BEEFPLNT  92.0 Circuit 1"
line "BRAW92    92.00" "BEEFPLNT  92.00" "1 " 1 0
0
line_87      "Line KNOB      161.0 to PILOTKNB 161.0 Circuit 1"
line "KNOB      161.00" "PILOTKNB 161.00" "1 " 1 0
0
line_88      "Line ELCENTSW 161.0 to NILAND   161.0 Circuit 1"

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line "ELCENTSW 161.00" "NILAND 161.00" "1 " 1 0
0
line_89 "Line AVE48 92.0 to AVE58 92.0 Circuit 1"
line "AVE48 92.00" "AVE58 92.00" "1 " 1 0
0
line_90 "Line MW1TAP 92.0 to MIDWAY 92.0 Circuit 1"
line "MW1TAP 92.00" "MIDWAY 92.00" "1 " 1 0
line "LEATHERS 92.00" "MW1TAP 92.00" "1 " 1 0
line "JJELMORE 92.00" "LEATHERS 92.00" "1 " 1 0
line "JJELMORE 92.00" "DELRAN 92.00" "1 " 1 0
tran "LEATHERS 92.00" "LEATHERS 14.40" "1 " 0
tran "JJELMORE 92.00" "JJELMORE 14.40" "1 " 0
tran "DELRAN 92.00" "DELRANCH 14.40" "1 " 0
gen "DELRANCH 14.40" "1 " 0
gen "LEATHERS 14.40" "1 " 0
gen "JJELMORE 14.40" "1 " 0
epcl "redispatch.p"
0
line_91 "Line USGYPS 92.0 to DIXIELAN 92.0 Circuit 1"
line "DIXIELAN 92.00" "USGYPS 92.00" "1 " 1 0
shunt "USGYPS 92.00" "b " 0
load "USGYPS 92.00" "1 " 0
gen "USGYPS 92.00" "1 " 0
epcl "redispatch.p"
0
line_92 "Line DROP4 92.0 to HOLTVILL 92.0 Circuit 1"
line "DROP4 92.00" "HOLTVILL 92.00" "1 " 1 0
0
tran_93 "Tran CVSUB 92.00 to COACHELA 230.00 Circuit 1"
tran "CVSUB 92.00" "COACHELA 230.00" "1 " 0
0
tran_94 "Tran CVSUB 92.00 to COACHELA 230.00 Circuit 2"
tran "CVSUB 92.00" "COACHELA 230.00" "2 " 0
0
tran_95 "Tran CVSUB 92.00 to CVSUB161 161.00 Circuit 1"
tran "CVSUB 92.00" "CVSUB161 161.00" "1 " 0
0
tran_96 "Tran AVE58 92.00 to AV58 161.00 Circuit 1"
tran "AVE58 92.00" "AV58 161.00" "1 " 0
0
tran_97 "Tran ELCENTSW 161.00 to ELCENTSW 230.00 Circuit 1"
tran "ELCENTSW 161.00" "ELCENTSW 230.00" "1 " 0
0
tran_98 "Tran ELCENTSW 161.00 to ELSTEAMP 92.00 Circuit 1"
tran "ELCENTSW 161.00" "ELSTEAMP 92.00" "1 " 0
0
tran_99 "Tran NILAND 161.00 to NILAND 92.00 Circuit 1"
tran "NILAND 161.00" "NILAND 92.00" "1 " 0
0
tran_100 "Tran PILOTKNB 161.00 to PILOTKNB 92.00 Circuit 1"
tran "PILOTKNB 161.00" "PILOTKNB 92.00" "1 " 0
tran "PKNOBDUM 1.00" "PILOTKNB 13.80" "1 " 0
0
tran_101 "Tran RAMON92 92.00 .0to RAMON 230.00 Circuit 1"
tran "RAMON92 92.00" "RAMON 230.00" "1 " 0
0
tran_102 "Tran HIGHLINE 230.00 to HIGHLINE 92.00 Circuit 1"

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line "HIGHLINE 92.00" "PRUETTAP 92.00" "1 " 1 0
line "PRUETTAP 92.00" "SIGCTAP 92.00" "1 " 1 0
line "SIGCTAP 92.00" "SIGC92 92.00" "1 " 1 0
line "HIGHLINE 92.00" "GEM23 92.00" "2 " 1 0
line "GEM92 92.00" "GEM23 92.00" "2 " 1 0
line "GEM23 92.00" "ORM2 92.00" "2 " 1 0
line "ORM2 92.00" "ORM1 92.00" "2 " 1 0
line "ORM12 13.80" "ORM1E 13.80" "1 " 1 0
line "ORM12 13.80" "ORM1H 13.80" "1 " 1 0
tran "HIGHLINE 230.00" "HIGHLINE 92.00" "1 " 0
tran "SIGC92 92.00" "SIGC13.8 13.80" "1" 0
tran "SIGC92 92.00" "ORCAL 13.80" "1 " 0
tran "ORM1H 13.80" "ORM1HG 00.60" "1 " 0
tran "ORM1H 13.80" "ORM1HM 00.48" "1 " 0
tran "ORM1E 13.80" "ORM1EG 00.60" "1 " 0
tran "ORM1E 13.80" "ORM1EM 00.48" "1 " 0
tran "ORM11 13.80" "ORM11M 00.48" "1 " 0
tran "ORM11 13.80" "ORM11G 00.60" "1 " 0
tran "ORM1 92.00" "ORM11 13.80" "2 " 0
tran "ORM1 92.00" "ORM12 13.80" "2 " 0
tran "GEM92 92.00" "GEM2 13.80" "2 " 0
tran "GEM92 92.00" "GEM3 13.80" "2 " 0
shunt "SIGC92 92.00" "b " 0
shunt "GEM92 92.00" "b " 0
shunt "ORM1 92.00" "b " 0
shunt "ORM2 92.00" "b " 0
load "ORCAL 13.8" "1 " 0
load "8914" "1 " 0
load "8913" "1 " 0
load "8904" "1 " 0
load "GEM2 13.80" "1 " 0
gen "GEM3 13.80" "1 " 0
gen "GEM2 13.80" "2 " 0
gen "GEM2 13.80" "1 " 0
gen "ORM11M 0.48" "1 " 0
gen "ORM11G 0.60" "1 " 0
gen "ORM1EM 0.48" "1 " 0
gen "ORM1EG 0.60" "1 " 0
gen "ORM1HM 0.48" "1 " 0
gen "ORM1HG 0.60" "1 " 0
gen "SIGC13.8 13.80" "1 " 0
gen "ORCAL 13.80" "1 " 0
epcl "redispatch.p"
0
tran_103 "Tran MIDWAY 230.00 to MIDWAY 92.00 Circuit 1"
tran "8699" "8700" "1 " 0
0
tran_104 "Tran MIDWAY 230.00 to MIDWAY 92.00 Circuit 2"
tran "8699" "8700" "2 " 0
0
tran_105 "Tran ELCENTSW 230.00 to ELSTEAMP 92.00 Circuit 1"
tran "ELCENTSW 230.00" "ELSTEAMP 92.00" "1 " 0
0
gen_106 "Gen BRAWLEY 34.5 Unit ID 1"
gen "BRAWLEY 34.50" "1 " 0
epcl "redispatch.p"
0

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gen_107      "Gen COACHLA3 13.8 Unit ID 1"
  gen "COACHLA3 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_108      "Gen ELSTM 3 13.8 Unit ID 1"
  gen "ELSTM 3 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_109      "Gen COACHLA4 13.8 Unit ID 1"
  gen "COACHLA4 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_110      "Gen COACHLA2 13.8 Unit ID 1"
  gen "COACHLA2 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_111      "Gen ROCKWOD2 13.8 Unit ID 1"
  gen "ROCKWOD2 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_112      "Gen ELSTM 2 and REPU2 13.8 Units ID 1"
  gen "ELSTM 2 13.80"    "1 " 0
  gen "REPU2 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_113      "Gen ELSTM 4 13.8 Unit ID 1"
  gen "ELSTM 4 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_114      "Gen ROCKWOD1 13.8 Unit ID 1"
  gen "ROCKWOD1 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_115      "Gen PILOTKNB 13.8 Unit ID 1"
  gen "PILOTKNB 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_116      "Gen HEBERSCE 13.8 Unit ID 1"
  gen "HEBERSCE 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_117      "Gen COACHLA1 13.8 Unit ID 1"
  gen "COACHLA1 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_118      "Gen NILAND GEN 13.8 Unit ID 1"
  gen "NILGEN 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_119      "Gen NILAND GEN2 13.8 Unit ID 1"
  gen "NILGEN2 13.80"    "1 " 0
  epcl "redispatch.p"
0
gen_120      "Gen EARTHE1 13.8 Unit ID 1"
  gen "EARTHE1 13.80"    "1 " 0
  epcl "redispatch.p"
0

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gen_121      "Gen  DROP4 1    6.9 Unit ID 1"
  gen "DROP4 1    6.90"    "1 " 0
  epcl "redispatch.p"
0
gen_122      "Gen  DROP4 2    6.9 Unit ID 1"
  gen "DROP4 2    6.90"    "1 " 0
  epcl "redispatch.p"
0
line_205     "line DEVERS   to VALLEYS 500 ck 1"
  line "DEVERS   500.00" "VALLEYS 500.00"    "1 " 1 0
0
line_206     "line HASSYAMP  to N.GILA 500 ck 1"
  line "HASSYAMP  500.00" "N.GILA 500.00"    "1 " 1 0
0
line_207     "line IMPRLVLY  to MIGUEL 500 ck 1"
  line "IMPRLVLY  500.00" "MIGUEL 500.00"    "1 " 1 0
0
line_210     "line N.GILA    to IMPRLVLY 500 ck 1"
  line "N.GILA    500.00" "IMPRLVLY 500.00"    "1 " 1 0
0
line_211     "line PALOVRDE  to DEVERS 500 ck 1"
  line "PALOVRDE  500.00" "DEVERS 500.00"    "1 " 1 0
0
tran_212     "tran DEVERS   to DEVERS 500/230 ck 1"
  tran "DEVERS   500.00" "DEVERS 230.00"    "1 " 1 0
0
tran_214     "tran N.GILA    to N.GILA 500/69 ck 1"
  tran "N.GILA    500.00" "N.GILA 69.00"    "1 " 1 0
0
line_221     "line DEVERS   to MIRAGE 230 ck 1"
  line "DEVERS   230.00" "MIRAGE 230.00"    "1 " 1 0
0
#line_222    "line DEVERS   to SANBRDNO 230 ck 2"
# line      "DEVERS   230.00" "SANBRDNO 230.00"    "2 " 1 0
#0
line_223     "line DEVERS   to VSTA 230 ck 2"
  line "DEVERS   230.00" "VSTA 230.00"    "2 " 1 0
0
line_231     "line J.HINDS  to EAGLEMTN 230 ck 1"
  line "J.HINDS  230.00" "EAGLEMTN 230.00"    "1 " 1 0
0
line_232     "line J.HINDS  to MIRAGE 230 ck 1"
  line "J.HINDS  230.00" "MIRAGE 230.00"    "1 " 1 0
0
line_246     "line SANBRDNO to DEVERS 230 ck 1"
  line "SANBRDNO 230.00" "DEVERS 230.00"    "1 " 1 0
0
line_250     "line VSTA     to DEVERS 230 ck 1"
  line "VSTA     230.00" "DEVERS 230.00"    "1 " 1 0
0
line_251     "line VSTA     to SANBRDNO 230 ck 2"
  line "VSTA     230.00" "SANBRDNO 230.00"    "2 " 1 0
0
tran_252     "tran MEAD     to MEAD N 345/230 ck 1"
  tran "MEAD     345.00" "MEAD N 230.00"    "1 " 1 0
0
tran_253     "tran MEAD S   to MEAD 230/287 ck 1"

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tran "MEAD S      230.00" "MEAD 287.00" "1 " 1 0
0
tran_254 "tran MEAD S to MEAD A 230/69 ck 1"
tran "MEAD S      230.00" "MEAD A 69.00" "1 " 1 0
0
tran_255 "tran MEAD S to MEAD B 230/69 ck 1"
tran "MEAD S      230.00" "MEAD B 69.00" "1 " 1 0
0
tran_256 "tran PARKER to PARKER 161/230 ck 1"
tran "PARKER      161.00" "PARKER 230.00" "1 " 1 0
0
tran_257 "tran PARKER to PARKER 161/230 ck 2"
tran "PARKER      161.00" "PARKER 230.00" "2 " 1 0
0
line_259 "line LIBERTY to PEACOCK 345 ck 1"
line "LIBERTY     345.00" "PEACOCK 345.00" "1 " 1 0
0
line_260 "line PEACOCK to MEAD 345 ck 1"
line "PEACOCK     345.00" "MEAD 345.00" "1 " 1 0
0
line_261 "line ELCENT to IVPS 230 ck 2"
line "8332" "22357" "2 " 1 0
0
tran_262 "tran IVPS to IMPERVLY PS ck 1"
tran "22356" "22357" 1 0
0
line_263 "line GLT TAP to BLYTHE 161 ck 1"
line "19105" "19020" "1 " 1 0
line "19105" "19051" "1 " 1 0
0
line_264 "line BUCKBLVD to BLYTHE 161 ck 1"
line "19101" "19020" "1 " 1 0
0
line_265 "line BLYTHESC to BLYTHE 161 ck 1"
line "24017" "19020" "1 " 1 0
0
line_266 "line HEADGATE to BLYTHE 161 ck 1"
line "19206" "19020" "1 " 1 0
0
line_267 "line PARKER to BLYTHE 161 ck 1"
line "19041" "19020" "1 " 1 0
0
line_268 "line IMPERIAL to DIXIELAND 230 ck 1"
line "22356" "8014" "1 " 1 0
0
line_269 "line INDIAN HILLS to PARADISE VALLEY 92 ck 1"
line "8001" "8009" "1 " 1 0
0
line_270 "line PARADISE VALLEY to COACHELLA VALLEY SUB 92 ck 1"
line "8009" "8279" "1 " 1 0
0
line_271 "line INDIAN HILLS to COACHELLA SWITCHING 92 ck 1"
line "8001" "8312" "1 " 1 0
0
line_272 "line INDIAN HILLS to VAN BUREN 92 ck 1"
line "8001" "8389" "1 " 1 0
0

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line_274      "line INDIAN HILLS   to CITRUS   92 ck 1"
line "8001"   "8305" "1 " 1 0
0
line_275      "line INDIAN HILLS   to SHADOW HILLS 92 ck 1"
line "8001"   "8406" "1 " 1 0
0
line_277      "line CITRUS   to SKY VALLEY 92 ck 1"
line "8305"   "8303" "1 " 1 0
0
line_278      "line SHADOW HILLS   to NORTH INDIO 92 ck 1"
line "8406"   "8004" "1 " 1 0
0
line_279      "line NORTH INDIO   to AVE 42   92 ck 1"
line "8004"   "8309" "1 " 1 0
0
tran_280      "Tran ELCENTROSW   230.00 to ELSTEAMP   92.00 Circuit 1"
tran "8332"   "8335" "1 " 0
0
tran_281      "Tran DIXIELAND    230.00 to DIXIELAND   92.00 Circuit 1"
tran "8014"   "8319" "1 " 0
0
tran_282      "Tran OAK_VLLY     230.00 to OAK_VLLY   115.00 Circuit 1"
tran "25666"  "25667" "1 " 0
0
tran_283      "Tran OAK_VLLY     230.00 to OAK_VLLY   115.00 Circuit 2"
tran "25666"  "25667" "2 " 0
0
line_284      "line DEVERS       to OAK_VLLY 230 ck 1"
line "24804"  "25666" "1 " 1 0
0
line_285      "line OAK_VLLY     to SANBRDNO 230 ck 1"
line "25666"  "24132" "1 " 1 0
0
end
# End of contingency list, 172 contingencies added to list

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#N-2 Contingency File

Line Contingency Criteria: From area 8 to 8; 92 kV to 230 kV

Modified contingency line_28 to include NBTAP - Siri (KEMA) - 07-26-07

line_1 "Loss of Transmission from Highline to Midway CK1(KN) & CK2(KS) from 230kV to 230kV"

```
line "8699" "8690" "1 " 1 0
line "8699" "8690" "2 " 1 0
tran "HIGHLINE 230.00" "HIGHLINE 92.00" "1 " 0
line "HIGHLINE 92.00" "PRUETTAP 92.00" "1 " 1 0
line "PRUETTAP 92.00" "SIGCTAP 92.00" "1 " 1 0
line "SIGCTAP 92.00" "SIGC92 92.00" "1 " 1 0
line "HIGHLINE 92.00" "GEM23 92.00" "2 " 1 0
line "GEM92 92.00" "GEM23 92.00" "2 " 1 0
line "GEM23 92.00" "ORM2 92.00" "2 " 1 0
line "ORM2 92.00" "ORM1 92.00" "2 " 1 0
line "ORM12 13.80" "ORM1E 13.80" "1 " 1 0
line "ORM12 13.80" "ORM1H 13.80" "1 " 1 0
tran "SIGC92 92.00" "SIGC13.8 13.80" "1" 0
tran "SIGC92 92.00" "ORCAL 13.80" "1 " 0
tran "ORM1H 13.80" "ORM1HG 00.60" "1 " 0
tran "ORM1H 13.80" "ORM1HM 00.48" "1 " 0
tran "ORM1E 13.80" "ORM1EG 00.60" "1 " 0
tran "ORM1E 13.80" "ORM1EM 00.48" "1 " 0
tran "ORM11 13.80" "ORM11M 00.48" "1 " 0
tran "ORM11 13.80" "ORM11G 00.60" "1 " 0
tran "ORM1 92.00" "ORM12 13.80" "2 " 0
tran "ORM1 92.00" "ORM2 13.80" "2 " 0
tran "GEM92 92.00" "GEM2 13.80" "2 " 0
tran "GEM92 92.00" "GEM3 13.80" "2 " 0
shunt "SIGC92 92.00" "b " 0
shunt "GEM92 92.00" "b " 0
shunt "ORM1 92.00" "b " 0
shunt "ORM2 92.00" "b " 0
load "ORCAL 13.8" "1 " 0
load "8914" "1 " 0
load "8913" "1 " 0
load "8904" "1 " 0
load "GEM2 13.80" "1 " 0
gen "GEM3 13.80" "1 " 0
gen "GEM2 13.80" "2 " 0
gen "GEM2 13.80" "1 " 0
gen "ORM11M 0.48" "1 " 0
gen "ORM11G 0.60" "1 " 0
gen "ORM1EM 0.48" "1 " 0
gen "ORM1EG 0.60" "1 " 0
gen "ORM1HM 0.48" "1 " 0
gen "ORM1HG 0.60" "1 " 0
gen "SIGC13.8 13.80" "1 " 0
gen "ORCAL 13.80" "1 " 0
```

epcl "redispatch.p"

0

line_2 "Loss of Transmission from Midway to Coachella CK1(KN) & CK2(KS) from 230kV to 230kV"

```
line "8699" "8311" "1 " 1 0
line "8699" "8311" "2 " 1 0
tran "COACHELA 230.00" "CVSUB 92.00" "2 " 0
line "8699" "8690" "1 " 1 0
```

```

line "8699" "8690" "2 " 1 0
tran "8699" "8700" "1 " 0
tran "8699" "8700" "2 " 0
tran "HIGHLINE 230.00" "HIGHLINE 92.00" "1 " 0
line "MIDWAY 92.00" "MWITAP 92.00" "1 " 1 0
line "LEATHERS 92.00" "MWITAP 92.00" "1 " 1 0
line "JJELMORE 92.00" "LEATHERS 92.00" "1 " 1 0
line "JJELMORE 92.00" "DELTRAN 92.00" "1 " 1 0
tran "LEATHERS 92.00" "LEATHERS 14.40" "1 " 0
tran "JJELMORE 92.00" "JJELMORE 14.40" "1 " 0
tran "DELTRAN 92.00" "DELTRAN 14.40" "1 " 0
gen "DELTRAN 14.40" "1 " 0
gen "LEATHERS 14.40" "1 " 0
gen "JJELMORE 14.40" "1 " 0
line "MIDWAY 92.00" "MINPLNT 92.00" "1 " 1 0
line "MINPLNT 92.00" "UNIT5 92.00" "1 " 1 0
line "UNIT5 92.00" "DESRTTAP 92.00" "1 " 1 0
tran "UNIT5 92.00" "UNIT5L 13.80" "1 " 0
tran "DESRTTAP 92.00" "DPWR#3 13.80" "1 " 0
gen "UNIT5L 13.80" "1 " 0
gen "DPWR#3 13.80" "1 " 0
line "MIDWAY 92.00" "VULCAN 92.00" "1 " 1 0
line "VULCAN 92.00" "EARTHE2 92.00" "1 " 1 0
line "EARTHE2 92.00" "REGLEX 92.00" "1 " 1 0
tran "VULCAN 92.00" "VULCAN1 14.40" "1 " 0
tran "REGLEX 92.00" "SALTSEA4 13.80" "1 " 0
gen "VULCAN1 14.40" "1 " 0
gen "VULCAN1 14.40" "2 " 0
gen "EARTHE2 92.00" "1 " 0
gen "SALTSEA4 13.80" "1 " 0
line "HIGHLINE 92.00" "PRUETTAP 92.00" "1 " 1 0
line "PRUETTAP 92.00" "SIGCTAP 92.00" "1 " 1 0
line "SIGCTAP 92.00" "SIGC92 92.00" "1 " 1 0
line "HIGHLINE 92.00" "GEM23 92.00" "2 " 1 0
line "GEM92 92.00" "GEM23 92.00" "2 " 1 0
line "GEM23 92.00" "ORM2 92.00" "2 " 1 0
line "ORM2 92.00" "ORM1 92.00" "2 " 1 0
line "ORM12 13.80" "ORM1E 13.80" "1 " 1 0
line "ORM12 13.80" "ORM1H 13.80" "1 " 1 0
tran "SIGC92 92.00" "SIGC13.8 13.80" "1 " 0
tran "SIGC92 92.00" "ORCAL 13.80" "1 " 0
tran "ORM1H 13.80" "ORM1HG 00.60" "1 " 0
tran "ORM1H 13.80" "ORM1HM 00.48" "1 " 0
tran "ORM1E 13.80" "ORM1EG 00.60" "1 " 0
tran "ORM1E 13.80" "ORM1EM 00.48" "1 " 0
tran "ORM11 13.80" "ORM11M 00.48" "1 " 0
tran "ORM11 13.80" "ORM11G 00.60" "1 " 0
tran "ORM1 92.00" "ORM11 13.80" "2 " 0
tran "ORM1 92.00" "ORM12 13.80" "2 " 0
tran "GEM92 92.00" "GEM2 13.80" "2 " 0
tran "GEM92 92.00" "GEM3 13.80" "2 " 0
shunt "SIGC92 92.00" "b " 0
shunt "GEM92 92.00" "b " 0
shunt "ORM1 92.00" "b " 0
shunt "ORM2 92.00" "b " 0
load "ORCAL 13.8" "1 " 0
load "8914" "1 " 0

```

```

load "8913"                "1 " 0
load "8904"                "1 " 0
load "GEM2" 13.80"        "1 " 0
gen "GEM3" 13.80"         "1 " 0
gen "GEM2" 13.80"         "2 " 0
gen "GEM2" 13.80"         "1 " 0
gen "ORM11M" 0.48"        "1 " 0
gen "ORM11G" 0.60"        "1 " 0
gen "ORM1EM" 0.48"        "1 " 0
gen "ORM1EG" 0.60"        "1 " 0
gen "ORM1HM" 0.48"        "1 " 0
gen "ORM1HG" 0.60"        "1 " 0
gen "SIGC13.8" 13.80"    "1 " 0
gen "ORCAL" 13.80"       "1 " 0
epcl "redispatch.p"
0
line_3 "Loss of Transmission from Coachella to Devers & Coachella to Ramon
(KN & KS Lines) 230kV to 230kV W/O RAS"
line "COACHELA 230.00" "DEVERS 230.00" "1 " 1 0
line "COACHELA 230.00" "RAMON 230.00" "1 " 1 0
tran "COACHELA 230.00" "CVSUB 92.00" "1 " 1 0
0
line_3b "Loss of Transmission from Coachella to Devers & Coachella to
Indian Hills (KN & KS Lines) 230kV to 230kV W/O RAS"
line "COACHELA 230.00" "DEVERS 230.00" "1 " 1 0
line "COACHELA 230.00" "8002" "1 " 1 0
tran "COACHELA 230.00" "CVSUB 92.00" "1 " 1 0
0
line_4 "Loss of Transmission ELSWITCH to IVSUB(S) 230kV & ELSWITCH to
AVE58(L) 161kV"
line "ELCENTSW 230.00" "IMPRLVLY 230.00" "1 " 1 0
line "ELCENTSW 161.00" "AV58TP1 161.00" "1 " 1 0
line "AV58TP1 161.00" "AV58 161.00" "1 " 1 0
0
line_5 "Loss of Transmission ELSWITCH to AVE58(L) 161kV & AVE58 to
CVSUB(L) 161kV"
line "ELCENTSW 161.00" "AV58TP1 161.00" "1 " 1 0
line "AV58TP1 161.00" "AV58 161.00" "1 " 1 0
line "AV58 161.00" "AV58TP2 161.00" "1 " 1 0
line "AV58TP2 161.00" "CVSUB161 161.00" "1 " 1 0
0
line_6 "Loss of Transmission ELSTEAMP to PILOTKNB(A) 161kV & ELSTEAMP to
Drop 4(B) 92kV"
line "ELCENTSW 161.00" "PILOTKNB 161.00" "1 " 1 0
line "ELSTEAMP 92.00" "ORMAT92 92.00" "1 " 1 0
line "ORMAT92 92.00" "DROP4 92.00" "1 " 1 0
0
line_7 "Loss of Transmission CLX92 to MALL (ED) 92kV & PRUETT to
ELSTEAMP(PW) 92kV"
line "CLX92 92.00" "MALL 92.00" "1 " 1 0
line "PRUETT 92.00" "ELSTEAMP 92.00" "1 " 1 0
0
line_8 "Loss of Transmission from ELTERMINAL to USNAF(LW) 92kV & from
ELTERMINAL to EUCLID(U) 92kV"
line "ELTERMIN 92.00" "USNAF 92.00" "1 " 1 0
line "ELTERMIN 92.00" "EUCLID 92.00" "1 " 1 0
0

```

line_9 "Loss of Transmission ELSTEAMP to ELTERMINAL(TE)92kV CK1 & from ELSTEAMP to ELTERMINAL(TW)92kV CK2"

line "ELSTEAMP 92.00" "ELTERMIN 92.00" "1 " 1 0
line "ELSTEAMP 92.00" "ELTERMIN 92.00" "2 " 1 0

0

line_10 "Loss of Transmission Holtville to Aten(LH)92kV & from Holtville to ELSTEAMP(E)92kV"

line "HOLTVILL 92.00" "ATEN 92.00" "1 " 1 0
line "HOLTVILL 92.00" "ELSTEAMP 92.00" "1 " 1 0

0

line_11 "Loss of Transmisson from DIXIELAN to DIXPRISON (R)92kV & from DIXIELAN to RTP3ANZA(R)92kV"

line "DIXIELAN 92.00" "DIXPRI2 92.00" "1 " 1 0
line "DIXPRI2 92.00" "DIXPRI 92.00" "1 " 1 0
line "DIXIELAN 92.00" "SUPERSTI 92.00" "1 " 1 0

0

line_12 "Loss of Transmisson from Central to DIXPRISON(R)92kV and from DIXPRISON to DIXIELAN(R)92kV"

line "DIXIELAN 92.00" "DIXPRI2 92.00" "1 " 1 0
line "DIXPRI2 92.00" "DIXPRI 92.00" "1 " 1 0
line "DIXPRI 92.00" "DIXPRI1 92.00" "1 " 1 0
line "DIXPRI1 92.00" "RTAP1 92.00" "1 " 1 0
line "RTAP1 92.00" "CENTRAL 92.00" "1 " 1 0

0

line_14 "Loss of Transmission from ROCKWOOD to BRAW92(J)92kV & FROM BRAW92 to BEEFPLNT(J)92kV"

line "ROCKWOOD 92.00" "BRAW92 92.00" "1 " 1 0
line "BRAW92 92.00" "BEEFPLNT 92.00" "1 " 1 0

0

line_15 "Loss of Transmission from AVE58 TO RTP5DSTS(R)92kV & from Ave 58 to COACHELLA (R) 92kV"

line "AVE58 92.00" "RTP6OASS 92.00" "1 " 1 0
line "RTP6OASS 92.00" "DSTSHRS 92.00" "1 " 1 0
line "RTP6OASS 92.00" "OASIS 92.00" "2 " 1 0
load "OASIS 92.00" "1" 0
shunt "OASIS 92.00" "b" 0
line "AVE58 92.00" "RTAP8 92.00" "1 " 1 0
line "RTAP8 92.00" "COACHELA 92.00" "1 " 1 0

0

line_16 "Loss of Transmission from AVE58 to COACHELLA(R)92kV & from CV Sub.to JACKSON(R)92kV"

line "AVE58 92.00" "RTAP8 92.00" "1 " 1 0
line "RTAP8 92.00" "COACHELA 92.00" "1 " 1 0
line "CVSUB 92.00" "JACKSON 92.00" "1 " 1 0

0

line_17 "Loss of Transmission from CVSUB to COACHELLA(CL)92kV CK1 & from CVSUB to COACHELLA(CN)92kV CK2"

line "CVSUB 92.00" "COACHELA 92.00" "1 " 1 0
line "CVSUB 92.00" "COACHELA 92.00" "2 " 1 0

0

line_18 "Loss of Transmission from AVE58 to JEFFERSON(CD)92kV & from AVE58 to AVE48(CS)92kV"

line "AVE58 92.00" "JEFERSN 92.00" "1 " 1 0
line "AVE58 92.00" "AVE48 92.00" "1 " 1 0

0

line_19 "Loss of Transmission from AVE42 to N.LAQ(CD)92kV & from AVE42 to SHIELDS(CS)92kV"

```

line "AVE42  92.00" "N.LAQUIN    92.00" "1 " 1 0
line "AVE42  92.00" "SHIELDS    92.00" "1 " 1 0
0
line_20 "Loss of Transmission from AVE42 to N.VIEW(CA)92kV & from AVE42 to
FRANWAY(CE)92kV"
line "AVE42  92.00" "N.VIEW    92.00" "1 " 1 0
line "AVE42  92.00" "FRANWAY    92.00" "1 " 1 0
0
line_21 "Loss of Transmission from RAMON92 to N.VIEW(CA)92kV & from FRANWAY to
EDOM(CE)92kV"
line "RAMON92  92.00" "N.VIEW    92.00" "1 " 1 0
line "EDOM    92.00" "FRANWAY    92.00" "1 " 1 0
0
line_22 "Loss of Transmission from HOLTVILLE to DROP4(E)92kV & from HIGHLINE to
PRUETTAP(HL1)92kV"
line "DROP4    92.00" "HOLTVILL  92.00" "1 " 1 0
line "HIGHLINE 92.00" "PRUETTAP  92.00" "1 " 1 0
line "PRUETTAP 92.00" "SIGCTAP   92.00" "1 " 1 0
line "SIGCTAP  92.00" "SIGC92    92.00" "1 " 1 0
shunt "SIGC92   92.00"          "b " 0
load "ORCAL   13.8"          "1 " 0
tran "SIGC92  92.00" "SIGC13.8 13.80" "1" 0
tran "SIGC92  92.00" "ORCAL    13.80" "1 " 0
gen "SIGC13.8 13.80"          "1 " 0
gen "ORCAL   13.80"          "1 " 0
epcl "redispatch.p"
0
line_23 "Loss of Transmission from HOLTVILLE to DROP4(E)92kV & from HIGHLINE to
GEM23(HL4)92kV"
line "DROP4    92.00" "HOLTVILL  92.00" "1 " 1 0
line "HIGHLINE 92.00" "GEM23     92.00" "2 " 1 0
line "GEM92    92.00" "GEM23     92.00" "2 " 1 0
line "GEM23    92.00" "ORM2      92.00" "2 " 1 0
line "ORM2     92.00" "ORM1      92.00" "2 " 1 0
line "ORM12    13.80" "ORM1E     13.80" "1 " 1 0
line "ORM12    13.80" "ORM1H     13.80" "1 " 1 0
tran "ORM1H    13.80" "ORM1HG    00.60" "1 " 0
tran "ORM1H    13.80" "ORM1HM    00.48" "1 " 0
tran "ORM1E    13.80" "ORM1EG    00.60" "1 " 0
tran "ORM1E    13.80" "ORM1EM    00.48" "1 " 0
tran "ORM11    13.80" "ORM11M    00.48" "1 " 0
tran "ORM11    13.80" "ORM11G    00.60" "1 " 0
tran "ORM1     92.00" "ORM11     13.80" "2 " 0
tran "ORM1     92.00" "ORM12     13.80" "2 " 0
tran "GEM92    92.00" "GEM2      13.80" "2 " 0
tran "GEM92    92.00" "GEM3      13.80" "2 " 0
shunt "GEM92   92.00"          "b " 0
shunt "ORM1    92.00"          "b " 0
shunt "ORM2    92.00"          "b " 0
load "8913"          "1 " 0
load "8914"          "1 " 0
load "8904"          "1 " 0
load "GEM2     13.80"          "1 " 0
gen "GEM3     13.80"          "1 " 0
gen "GEM2     13.80"          "2 " 0
gen "GEM2     13.80"          "1 " 0
gen "ORM11M   0.48"          "1 " 0

```

```

gen "ORM11G    0.60"          "1 "    0
gen "ORM1EM    0.48"          "1 "    0
gen "ORM1EG    0.60"          "1 "    0
gen "ORM1HM    0.48"          "1 "    0
gen "ORM1HG    0.60"          "1 "    0
epcl "redispatch.p"

```

0

line_24 "Loss of Transmission from IMPERIAL to PANNO(EO)92kV & from BRAWLEY to PANNO(EO)92kV"

```

line "IMPERIAL  92.00" "PANNO    92.00" "1 "  1 0
line "BRAW92    92.00" "PANNO    92.00" "1 "  1 0

```

0

line_25 "Loss of Transmission from AVE42 to MONROE(CW)92kV & from AVE42 to SHAHILLS(CI)92kV"

```

line "AVE42     92.00" "MONROE  92.00" "1 "  1 0
line "AVE42     92.00" "SHAHILLS 92.00" "1 "  1 0

```

0

line_26 "Loss of Transmission from NILAND to PRISON(J)92kV & from CALIPAT to PRISON(J)92kV"

```

line "NILAND    92.00" "PRITP1  92.00" "1 "  1 0
line "PRITP1    92.00" "PRISON   92.00" "1 "  1 0
line "CALIPAT   92.00" "CALPTTAP 92.00" "1 "  1 0
line "CALPTTAP  92.00" "PRITP2   92.00" "1 "  1 0
line "PRITP2    92.00" "PRISON   92.00" "1 "  1 0

```

0

line_27 "Loss of Transmission from CALIPAT to PRISON(J)92kV & from CALIPAT to BEEFPLNT(J)92kV"

```

line "CALIPAT   92.00" "CALPTTAP 92.00" "1 "  1 0
line "CALPTTAP  92.00" "PRITP2   92.00" "1 "  1 0
line "PRITP2    92.00" "PRISON   92.00" "1 "  1 0
line "CALIPAT   92.00" "CALTP2   92.00" "1 "  1 0
line "CALTP2    92.00" "BEEFPLNT 92.00" "1 "  1 0

```

0

line_28 "Loss of Transmission from PARKVIEW to CALIPAT(CO)92kV & from BRAWLEY to PARKVIEW(CO)92kV"

```

line "PARKVIEW  92.00" "NBTAP    92.00" "1 "  1 0
line "NBTAP     92.00" "CALIPAT  92.00" "1 "  1 0
line "BRAW92    92.00" "PARKVIEW 92.00" "1 "  1 0

```

0

line_29 "Loss of Transmission from CALIPAT to BEEFPLNT(J)92kV & from BRAWLEY to BEEFPLNT(J)92kV"

```

line "CALIPAT   92.00" "CALTP2   92.00" "1 "  1 0
line "CALTP2    92.00" "BEEFPLNT 92.00" "1 "  1 0
line "BRAW92    92.00" "BEEFPLNT 92.00" "1 "  1 0

```

0

line_30 "Loss of Transmission from CLX92 to MALL(ED)92kV & from ELSTEAMP to MALL(ED)92kV"

```

line "CLX92     92.00" "MALL     92.00" "1 "  1 0
line "ELSTEAMP  92.00" "MALL     92.00" "1 "  1 0

```

0

line_31 "Loss of Transmission from ELSTAMP to HEBERSCE(P)92kV & from HEBERSCE to PERRY(P)92kV"

```

line "ELSTEAMP  92.00" "HEBERSCE 92.00" "1 "  1 0
line "HEBERSCE  92.00" "PERRY     92.00" "1 "  1 0
tran "HEBERSCE  92.00" "HEBERSCE 13.80" "1"    0
tran "HEBERSCE 13.80" "HGCLD11  00.48" "1 "   0
tran "HEBERSCE 13.80" "HGCLD12  00.48" "1 "   0

```

```

load "HGCLD11 00.48" "1 " 0
load "HGCLD12 00.48" "1 " 0
gen "HEBERSCE 13.80" "1 " 0
gen "HEBERSCE 13.80" "11 " 0
gen "HEBERSCE 13.80" "12 " 0
epcl "redispatch.p"
0
line_32 "Loss of Transmission from DROP3 to DROP4(G)92kV & from DROP4 to
DROP2(H)92kV"
line "DROP3 92.00" "DROP4 92.00" "1 " 1 0
line "DROP4 92.00" "DROP2 92.00" "1 " 1 0
tran "8321" "8659" "1 " 0
gen "DROP2 6.90" "1 " 0
epcl "redispatch.p"
0
line_33 "Loss of Transmission from ELSTEAMP to HEBERSCE(P)92kV & from HIGHLINE
to PRUETTAP(HL1)92kV"
line "ELSTEAMP 92.00" "HEBERSCE 92.00" "1 " 1 0
line "HIGHLINE 92.00" "PRUETTAP 92.00" "1 " 1 0
line "PRUETTAP 92.00" "SIGCTAP 92.00" "1 " 1 0
line "SIGCTAP 92.00" "SIGC92 92.00" "1 " 1 0
shunt "SIGC92 92.00" "b " 0
load "ORCAL 13.8" "1 " 0
tran "SIGC92 92.00" "SIGC13.8 13.80" "1 " 0
tran "SIGC92 92.00" "ORCAL 13.80" "1 " 0
gen "SIGC13.8 13.80" "1 " 0
gen "ORCAL 13.80" "1 " 0
epcl "redispatch.p"
0
line_34 "W/RAS Loss of Lines from CV Sub.to Devers & CV Sub.to Ramon (KN & KS)
Plus CV Sub.Bank 1"
line "COACHELA 230.00" "DEVERS 230.00" "1 " 1 0
line "COACHELA 230.00" "RAMON 230.00" "1 " 1 0
line "HIGHLINE 92.00" "GEM23 92.00" "2 " 1 0
line "GEM92 92.00" "GEM23 92.00" "2 " 1 0
line "GEM23 92.00" "ORM2 92.00" "2 " 1 0
line "ORM2 92.00" "ORM1 92.00" "2 " 1 0
line "ORM12 13.80" "ORM1E 13.80" "1 " 1 0
line "ORM12 13.80" "ORM1H 13.80" "1 " 1 0
line "MIDWAY 92.00" "MINPLNT 92.00" "1 " 1 0
line "MINPLNT 92.00" "UNIT5 92.00" "1 " 1 0
line "UNIT5 92.00" "DES RTPWR 92.00" "1 " 1 0
line "MIDWAY 92.00" "VULCAN 92.00" "1 " 1 0
line "VULCAN 92.00" "EARTHE2 92.00" "1 " 1 0
line "EARTHE2 92.00" "REG1EX 92.00" "1 " 1 0
tran "COACHELA 230.00" "CVSUB 92.00" "1 " 1 0
tran "VULCAN 92.00" "VULCAN1 14.40" "1 " 0
tran "REG1EX 92.00" "SALTSEA4 13.80" "1 " 0
tran "UNIT5 92.00" "UNIT5L 13.80" "1 " 0
tran "DES RTPWR 92.00" "DPWR#3 13.80" "1 " 0
tran "ORM1H 13.80" "ORM1HG 00.60" "1 " 0
tran "ORM1H 13.80" "ORM1HM 00.48" "1 " 0
tran "ORM1E 13.80" "ORM1EG 00.60" "1 " 0
tran "ORM1E 13.80" "ORM1EM 00.48" "1 " 0
tran "ORM11 13.80" "ORM11M 00.48" "1 " 0
tran "ORM11 13.80" "ORM11G 00.60" "1 " 0
tran "ORM1 92.00" "ORM11 13.80" "2 " 0

```

tran	"ORM1	92.00"	"ORM12	13.80"	"2 "	0
tran	"GEM92	92.00"	"GEM2	13.80"	"2 "	0
tran	"GEM92	92.00"	"GEM3	13.80"	"2 "	0
shunt	"GEM92	92.00"			"b "	0
shunt	"ORM1	92.00"			"b "	0
shunt	"ORM2	92.00"			"b "	0
load	"8914"				"1 "	0
load	"8913"				"1 "	0
load	"8904"				"1 "	0
load	"GEM2	13.80"			"1 "	0
gen	"VULCAN1	14.40"	"1 "	0		
gen	"VULCAN1	14.40"	"2 "	0		
gen	"EARTHE2	92.00"	"1 "	0		
gen	"SALTSEA4	13.80"	"1 "	0		
gen	"UNIT5L	13.80"			"1 "	0
gen	"DPWR#3	13.80"			"1 "	0
gen	"GEM3	13.80"			"1 "	0
gen	"GEM2	13.80"			"2 "	0
gen	"GEM2	13.80"			"1 "	0
gen	"ORM11M	0.48"			"1 "	0
gen	"ORM11G	0.60"			"1 "	0
gen	"ORM1EM	0.48"			"1 "	0
gen	"ORM1EG	0.60"			"1 "	0
gen	"ORM1HM	0.48"			"1 "	0
gen	"ORM1HG	0.60"			"1 "	0

epcl "redispatch.p"

0

line_34b "W/RAS Loss of Lines from CV Sub.to Devers & CV Sub.to Indian Hills (KN & KS) Plus CV Sub.Bank 1"

line	"COACHELA	230.00"	"DEVERS	230.00"	"1 "	1	0
line	"COACHELA	230.00"	"8002"		"1 "	1	0
line	"HIGHLINE	92.00"	"GEM23	92.00"	"2 "	1	0
line	"GEM92	92.00"	"GEM23	92.00"	"2 "	1	0
line	"GEM23	92.00"	"ORM2	92.00"	"2 "	1	0
line	"ORM2	92.00"	"ORM1	92.00"	"2 "	1	0
line	"ORM12	13.80"	"ORM1E	13.80"	"1 "	1	0
line	"ORM12	13.80"	"ORM1H	13.80"	"1 "	1	0
line	"MIDWAY	92.00"	"MINPLNT	92.00"	"1 "	1	0
line	"MINPLNT	92.00"	"UNIT5	92.00"	"1 "	1	0
line	"UNIT5	92.00"	"DES RTPWR	92.00"	"1 "	1	0
line	"MIDWAY	92.00"	"VULCAN	92.00"	"1 "	1	0
line	"VULCAN	92.00"	"EARTHE2	92.00"	"1 "	1	0
line	"EARTHE2	92.00"	"REGLEX	92.00"	"1 "	1	0
tran	"COACHELA	230.00"	"CVSUB	92.00"	"1 "	1	0
tran	"VULCAN	92.00"	"VULCAN1	14.40"	"1 "	0	
tran	"REGLEX	92.00"	"SALTSEA4	13.80"	"1 "	0	
tran	"UNIT5	92.00"	"UNIT5L	13.80"	"1 "	0	
tran	"DES RTPWR	92.00"	"DPWR#3	13.80"	"1 "	0	
tran	"ORM1H	13.80"	"ORM1HG	00.60"	"1 "	0	
tran	"ORM1H	13.80"	"ORM1HM	00.48"	"1 "	0	
tran	"ORM1E	13.80"	"ORM1EG	00.60"	"1 "	0	
tran	"ORM1E	13.80"	"ORM1EM	00.48"	"1 "	0	
tran	"ORM11	13.80"	"ORM11M	00.48"	"1 "	0	
tran	"ORM11	13.80"	"ORM11G	00.60"	"1 "	0	
tran	"ORM1	92.00"	"ORM11	13.80"	"2 "	0	
tran	"ORM1	92.00"	"ORM12	13.80"	"2 "	0	
tran	"GEM92	92.00"	"GEM2	13.80"	"2 "	0	

```

tran "GEM92  92.00" "GEM3  13.80"      .      "2 "      0
shunt "GEM92   92.00"                "b "      0
shunt "ORM1    92.00"                "b "      0
shunt "ORM2    92.00"                "b "      0
load  "8914"                "1 "      0
load  "8913"                "1 "      0
load  "8904"                "1 "      0
load  "GEM2    13.80"          "1 "      0
gen   "VULCAN1 14.40"          "1 "      0
gen   "VULCAN1 14.40"          "2 "      0
gen   "EARTHE2 92.00"          "1 "      0
gen   "SALTSEA4 13.80"        "1 "      0
gen   "UNIT5L  13.80"          "1 "      0
gen   "DPWR#3  13.80"          "1 "      0
gen   "GEM3    13.80"          "1 "      0
gen   "GEM2    13.80"          "2 "      0
gen   "GEM2    13.80"          "1 "      0
gen   "ORM11M  0.48"          "1 "      0
gen   "ORM11G  0.60"          "1 "      0
gen   "ORM1EM  0.48"          "1 "      0
gen   "ORM1EG  0.60"          "1 "      0
gen   "ORM1HM  0.48"          "1 "      0
gen   "ORM1HG  0.60"          "1 "      0
epcl  "redispatch.p"
0
line_35 "W/RAS Loss of Lines from CV Sub.to Devers & CV Sub.to Ramon (KN & KS)
Plus CV Sub.Banks 1 and 2"
line  "COACHELA 230.00" "DEVERS  230.00" "1 " 1 0
line  "COACHELA 230.00" "RAMON  230.00" "1 " 1 0
line  "8699" "8311" "1 " 1 0
line  "8699" "8311" "2 " 1 0
line  "8699" "8690" "1 " 1 0
line  "8699" "8690" "2 " 1 0
tran  "CVSUB    92.00" "COACHELA 230.00" "1 " 0
tran  "CVSUB    92.00" "COACHELA 230.00" "2 " 0
tran  "8699" "8700" "1 " 0
tran  "8699" "8700" "2 " 0
tran  "HIGHLINE 230.00" "HIGHLINE  92.00" "1 " 0
line  "MIDWAY   92.00" "MWITAP   92.00" "1 " 1 0
line  "LEATHERS 92.00" "MWITAP   92.00" "1 " 1 0
line  "JJELMORE 92.00" "LEATHERS  92.00" "1 " 1 0
line  "JJELMORE 92.00" "DELTRAN   92.00" "1 " 1 0
tran  "LEATHERS 92.00" "LEATHERS  14.40" "1 " 0
tran  "JJELMORE 92.00" "JJELMORE  14.40" "1 " 0
tran  "DELTRAN  92.00" "DELRANCH  14.40" "1 " 0
gen   "DELRANCH 14.40"          "1 "      0
gen   "LEATHERS 14.40"          "1 "      0

```

```

line "EARTHE2  92.00" "REGLEX  92.00" "1 " 1 0
tran "VULCAN  92.00" "VULCAN1 14.40" "1 " 0
tran "REGLEX  92.00" "SALTSEA4 13.80" "1 " 0
gen "VULCAN1  14.40" "1 " 0
gen "VULCAN1  14.40" "2 " 0
gen "EARTHE2  92.00" "1 " 0
gen "SALTSEA4 13.80" "1 " 0
line "HIGHLINE 92.00" "PRUETTAP 92.00" "1 " 1 0
  line "PRUETTAP  92.00" "SIGCTAP  92.00" "1 " 1 0
  line "SIGCTAP  92.00" "SIGC92  92.00" "1 " 1 0
  line "HIGHLINE 92.00" "GEM23  92.00" "2 " 1 0
  line "GEM92  92.00" "GEM23  92.00" "2 " 1 0
  line "GEM23  92.00" "ORM2  92.00" "2 " 1 0
  line "ORM2  92.00" "ORM1  92.00" "2 " 1 0
  line "ORM12  13.80" "ORM1E  13.80" "1 " 1 0
  line "ORM12  13.80" "ORM1H  13.80" "1 " 1 0
tran "SIGC92  92.00" "SIGC13.8 13.80" "1" 0
tran "SIGC92  92.00" "ORCAL 13.80" "1 " 0
tran "ORM1H  13.80" "ORM1HG 00.60" "1 " 0
tran "ORM1H  13.80" "ORM1HM 00.48" "1 " 0
tran "ORM1E  13.80" "ORM1EG 00.60" "1 " 0
tran "ORM1E  13.80" "ORM1EM 00.48" "1 " 0
tran "ORM11  13.80" "ORM11M 00.48" "1 " 0
tran "ORM11  13.80" "ORM11G 00.60" "1 " 0
tran "ORM1  92.00" "ORM11 13.80" "2 " 0
tran "ORM1  92.00" "ORM12 13.80" "2 " 0
tran "GEM92  92.00" "GEM2  13.80" "2 " 0
tran "GEM92  92.00" "GEM3  13.80" "2 " 0
shunt "SIGC92  92.00" "b " 0
shunt "GEM92  92.00" "b " 0
shunt "ORM1  92.00" "b " 0
shunt "ORM2  92.00" "b " 0
load "ORCAL  13.8" "1 " 0
load "8914" "1 " 0
load "8913" "1 " 0
load "8904" "1 " 0
load "GEM2  13.80" "1 " 0
gen "GEM3  13.80" "1 " 0
gen "GEM2  13.80" "2 " 0
gen "GEM2  13.80" "1 " 0
gen "ORM11M  0.48" "1 " 0
gen "ORM11G  0.60" "1 " 0
gen "ORM1EM  0.48" "1 " 0
gen "ORM1EG  0.60" "1 " 0
gen "ORM1HM  0.48" "1 " 0
gen "ORM1HG  0.60" "1 " 0
gen "SIGC13.8 13.80" "1 " 0
gen "ORCAL  13.80" "1 " 0

```

epc1 "redispatch.p"

0

line_35b "W/RAS Loss of Lines from CV Sub.to Devers & CV Sub.to Indian Hills (KN & KS) Plus CV Sub.Banks 1 and 2"

```

line "COACHELA 230.00" "DEVERS  230.00" "1 " 1 0
line "COACHELA 230.00" "IND.HILL 230.00" "1 " 1 0
line "8699" "8311" "1 " 1 0
line "8699" "8311" "2 " 1 0
line "8699" "8690" "1 " 1 0

```

```

line "8699" "8690" "2 " 1 0
tran "CVSUB 92.00" "COACHELA 230.00" "1 " 0
tran "CVSUB 92.00" "COACHELA 230.00" "2 " 0
tran "8699" "8700" "1 " 0
tran "8699" "8700" "2 " 0
tran "HIGHLINE 230.00" "HIGHLINE 92.00" "1 " 0
line "MIDWAY 92.00" "MW1TAP 92.00" "1 " 1 0
line "LEATHERS 92.00" "MW1TAP 92.00" "1 " 1 0
line "JJELMORE 92.00" "LEATHERS 92.00" "1 " 1 0
line "JJELMORE 92.00" "DELRAN 92.00" "1 " 1 0
tran "LEATHERS 92.00" "LEATHERS 14.40" "1 " 0
tran "JJELMORE 92.00" "JJELMORE 14.40" "1 " 0
tran "DELRAN 92.00" "DELRANCH 14.40" "1 " 0
gen "DELRANCH 14.40" "1 " 0
gen "LEATHERS 14.40" "1 " 0
gen "JJELMORE 14.40" "1 " 0
line "MIDWAY 92.00" "MINPLNT 92.00" "1 " 1 0
line "MINPLNT 92.00" "UNIT5 92.00" "1 " 1 0
line "UNIT5 92.00" "DES RTPWR 92.00" "1 " 1 0
tran "UNIT5 92.00" "UNIT5L 13.80" "1 " 0
tran "DES RTPWR 92.00" "DPWR#3 13.80" "1 " 0
gen "UNIT5L 13.80" "1 " 0
gen "DPWR#3 13.80" "1 " 0
line "MIDWAY 92.00" "VULCAN 92.00" "1 " 1 0
line "VULCAN 92.00" "EARTHE2 92.00" "1 " 1 0
line "EARTHE2 92.00" "REGLEX 92.00" "1 " 1 0
tran "VULCAN 92.00" "VULCAN1 14.40" "1 " 0
tran "REGLEX 92.00" "SALTSEA4 13.80" "1 " 0
gen "VULCAN1 14.40" "1 " 0
gen "VULCAN1 14.40" "2 " 0
gen "EARTHE2 92.00" "1 " 0
gen "SALTSEA4 13.80" "1 " 0
line "HIGHLINE 92.00" "PRUETTAP 92.00" "1 " 1 0
line "PRUETTAP 92.00" "SIGCTAP 92.00" "1 " 1 0
line "SIGCTAP 92.00" "SIGC92 92.00" "1 " 1 0
line "HIGHLINE 92.00" "GEM23 92.00" "2 " 1 0
line "GEM92 92.00" "GEM23 92.00" "2 " 1 0
line "GEM23 92.00" "ORM2 92.00" "2 " 1 0
line "ORM2 92.00" "ORM1 92.00" "2 " 1 0
line "ORM12 13.80" "ORM1E 13.80" "1 " 1 0
line "ORM12 13.80" "ORM1H 13.80" "1 " 1 0
tran "SIGC92 92.00" "SIGC13.8 13.80" "1 " 0
tran "SIGC92 92.00" "ORCAL 13.80" "1 " 0
tran "ORM1H 13.80" "ORM1HG 00.60" "1 " 0
tran "ORM1H 13.80" "ORM1HM 00.48" "1 " 0
tran "ORM1E 13.80" "ORM1EG 00.60" "1 " 0
tran "ORM1E 13.80" "ORM1EM 00.48" "1 " 0
tran "ORM11 13.80" "ORM11M 00.48" "1 " 0
tran "ORM11 13.80" "ORM11G 00.60" "1 " 0
tran "ORM1 92.00" "ORM11 13.80" "2 " 0
tran "ORM1 92.00" "ORM12 13.80" "2 " 0
tran "GEM92 92.00" "GEM2 13.80" "2 " 0
tran "GEM92 92.00" "GEM3 13.80" "2 " 0
shunt "SIGC92 92.00" "b " 0
shunt "GEM92 92.00" "b " 0
shunt "ORM1 92.00" "b " 0
shunt "ORM2 92.00" "b " 0

```

```

load "ORCAL      13.8"           "1 " 0
load "8914"           "1 " 0
load "8913"           "1 " 0
load "8904"           "1 " 0
load "GEM2      13.80"         "1 " 0
gen "GEM3      13.80"         "1 " 0
gen "GEM2      13.80"         "2 " 0
gen "GEM2      13.80"         "1 " 0
gen "ORM11M    0.48"         "1 " 0
gen "ORM11G    0.60"         "1 " 0
gen "ORM1EM    0.48"         "1 " 0
gen "ORM1EG    0.60"         "1 " 0
gen "ORM1HM    0.48"         "1 " 0
gen "ORM1HG    0.60"         "1 " 0
gen "SIGC13.8 13.80"         "1 " 0
gen "ORCAL     13.80"         "1 " 0
epcl "redispatch.p"
0
line_36 "W/O RAS RAMON230 230.0 to MIRAGE & COACHELA 230.0 to DEVERS"
line "COACHELA 230.00" "DEVERS 230.00" "1 " 1 0
line "RAMON 230.00" "MIRAGE 230.00" "1 " 1 0
0
line_37 "W/RAS RAMON230 230.0 to MIRAGE & COACHELA 230.0 to DEVERS"
line "COACHELA 230.00" "DEVERS 230.00" "1 " 1 0
line "RAMON 230.00" "MIRAGE 230.00" "1 " 1 0
line "HIGHLINE 92.00" "GEM23 92.00" "2 " 1 0
line "GEM92 92.00" "GEM23 92.00" "2 " 1 0
line "GEM23 92.00" "ORM2 92.00" "2 " 1 0
line "ORM2 92.00" "ORM1 92.00" "2 " 1 0
line "ORM12 13.80" "ORM1E 13.80" "1 " 1 0
line "ORM12 13.80" "ORM1H 13.80" "1 " 1 0
line "MIDWAY 92.00" "MINPLNT 92.00" "1 " 1 0
line "MINPLNT 92.00" "UNIT5 92.00" "1 " 1 0
line "UNIT5 92.00" "DES RTPWR 92.00" "1 " 1 0
line "MIDWAY 92.00" "VULCAN 92.00" "1 " 1 0
line "VULCAN 92.00" "EARTHE2 92.00" "1 " 1 0
line "EARTHE2 92.00" "REGLEX 92.00" "1 " 1 0
tran "COACHELA 230.00" "CVSUB 92.00" "1 " 1 0
tran "VULCAN 92.00" "VULCAN1 14.40" "1 " 0
tran "REGLEX 92.00" "SALTSEA4 13.80" "1 " 0
tran "UNIT5 92.00" "UNIT5L 13.80" "1 " 0
tran "DES RTPWR 92.00" "DPWR#3 13.80" "1 " 0
tran "ORM1H 13.80" "ORM1HG 00.60" "1 " 0
tran "ORM1H 13.80" "ORM1HM 00.48" "1 " 0
tran "ORM1E 13.80" "ORM1EG 00.60" "1 " 0
tran "ORM1E 13.80" "ORM1EM 00.48" "1 " 0
tran "ORM11 13.80" "ORM11M 00.48" "1 " 0
tran "ORM11 13.80" "ORM11G 00.60" "1 " 0
tran "ORM1 92.00" "ORM11 13.80" "2 " 0
tran "ORM1 92.00" "ORM12 13.80" "2 " 0
tran "GEM92 92.00" "GEM2 13.80" "2 " 0
tran "GEM92 92.00" "GEM3 13.80" "2 " 0
shunt "GEM92 92.00" "b " 0
shunt "ORM1 92.00" "b " 0
shunt "ORM2 92.00" "b " 0
load "8914" "1 " 0
load "8913" "1 " 0

```

```

load "8904"                "1 " 0
load "GEM2" 13.80"        "1 " 0
gen "VULCAN1 14.40"       "1 " 0
gen "VULCAN1 14.40"       "2 " 0
gen "EARTHE2 92.00"      "1 " 0
gen "SALTSEA4 13.80"     "1 " 0
gen "UNIT5L 13.80"       "1 " 0
gen "DPWR#3 13.80"       "1 " 0
gen "GEM3 13.80"         "1 " 0
gen "GEM2 13.80"         "2 " 0
gen "GEM2 13.80"         "1 " 0
gen "ORM11M 0.48"        "1 " 0
gen "ORM11G 0.60"        "1 " 0
gen "ORM1EM 0.48"        "1 " 0
gen "ORM1EG 0.60"        "1 " 0
gen "ORM1HM 0.48"        "1 " 0
gen "ORM1HG 0.60"        "1 " 0
epcl "redispatch.p"
0
tran_38 "Tran YUCCA161 161.00 to YUCCA W 69.00 CK1 & CK2"
tran "YUCCA161 161.00" "YUCCA W 69.00" "1 " 0
tran "YUCCA161 161.00" "YUCCA W 69.00" "2 " 0
line "YUCCA161 161.00" "PILOTKNB 161.00" "1 " 1 0
tran "YUCCA161 161.00" "YUCCGT21 13.8" "1 " 0
gen "YUCCGT21 13.80" "1 " 0
epcl "redispatch.p"
0
tran_39 "Tran CVSUB 92.00 to COACHELA 230.00 CK1 & CK2"
tran "CVSUB 92.00" "COACHELA 230.00" "1 " 0
tran "CVSUB 92.00" "COACHELA 230.00" "2 " 0
0
tran_40 "Tran MIDWAY 230.00 to MIDWAY 92.00 Ck1 & CK2"
tran "8699" "8700" "1 " 0
tran "8699" "8700" "2 " 0
line "MIDWAY 92.00" "MWITAP 92.00" "1 " 1 0
line "LEATHERS 92.00" "MWITAP 92.00" "1 " 1 0
line "JJELMORE 92.00" "LEATHERS 92.00" "1 " 1 0
line "JJELMORE 92.00" "DELTRAN 92.00" "1 " 1 0
tran "LEATHERS 92.00" "LEATHERS 14.40" "1 " 0
tran "JJELMORE 92.00" "JJELMORE 14.40" "1 " 0
tran "DELTRAN 92.00" "DELTRAN 14.40" "1 " 0
gen "DELTRAN 14.40" "1 " 0
gen "LEATHERS 14.40" "1 " 0
gen "JJELMORE 14.40" "1 " 0
line "MIDWAY 92.00" "MINPLNT 92.00" "1 " 1 0
line "MINPLNT 92.00" "UNIT5 92.00" "1 " 1 0
line "UNIT5 92.00" "DESRTW 92.00" "1 " 1 0
tran "UNIT5 92.00" "UNIT5L 13.80" "1 " 0
tran "DESRTW 92.00" "DPWR#3 13.80" "1 " 0
gen "UNIT5L 13.80" "1 " 0
gen "DPWR#3 13.80" "1 " 0
line "MIDWAY 92.00" "VULCAN 92.00" "1 " 1 0
line "VULCAN 92.00" "EARTHE2 92.00" "1 " 1 0
line "EARTHE2 92.00" "REGLEX 92.00" "1 " 1 0
tran "VULCAN 92.00" "VULCAN1 14.40" "1 " 0
tran "REGLEX 92.00" "SALTSEA4 13.80" "1 " 0
gen "VULCAN1 14.40" "1 " 0

```

```
gen "VULCAN1 14.40" "2 " 0
gen "EARTHE2 92.00" "1 " 0
gen "SALTSEA4 13.80" "1 " 0
epcl "redispatch.p"
0
tran_41 "Tran Pilot Knob 161kV to Pilot Knob 92kV CK1 & CK2"
tran "PILOTKNB 161.00" "PILOTKNB 92.00" "1 " 0
tran "PILOTKNB 161.00" "PILOTKNB 92.00" "1 " 0
tran "PILOTKNB 161.00" "PILOTKNB 92.00" "1 " 0
tran "PKNOBDUM 1.00" "PILOTKNB 13.80" "1 " 0
0
line_42 "Loss of Transmission from Indian Hills to Vanburen & Shadow H"
line "IND.HILL 92.00" "VANBUREN 92.00" "1 " 1 0
line "IND.HILL 92.00" "SHAHILLS 92.00" "1 " 1 0
0
line_43 "Loss of Transmission from Indian Hills to PARADISE & CVSUB"
line "IND.HILL 92.00" "PARADISE 92.00" "1 " 1 0
line "IND.HILL 92.00" "COACHELA 92.00" "1 " 1 0
0
end
#End of Contingency List. 41 Contingencies Added to List
```

**North Brawley
System Impact Study**



**Appendix B
Peak Heavy Summer Power Flow Results
Pre and Post Project**

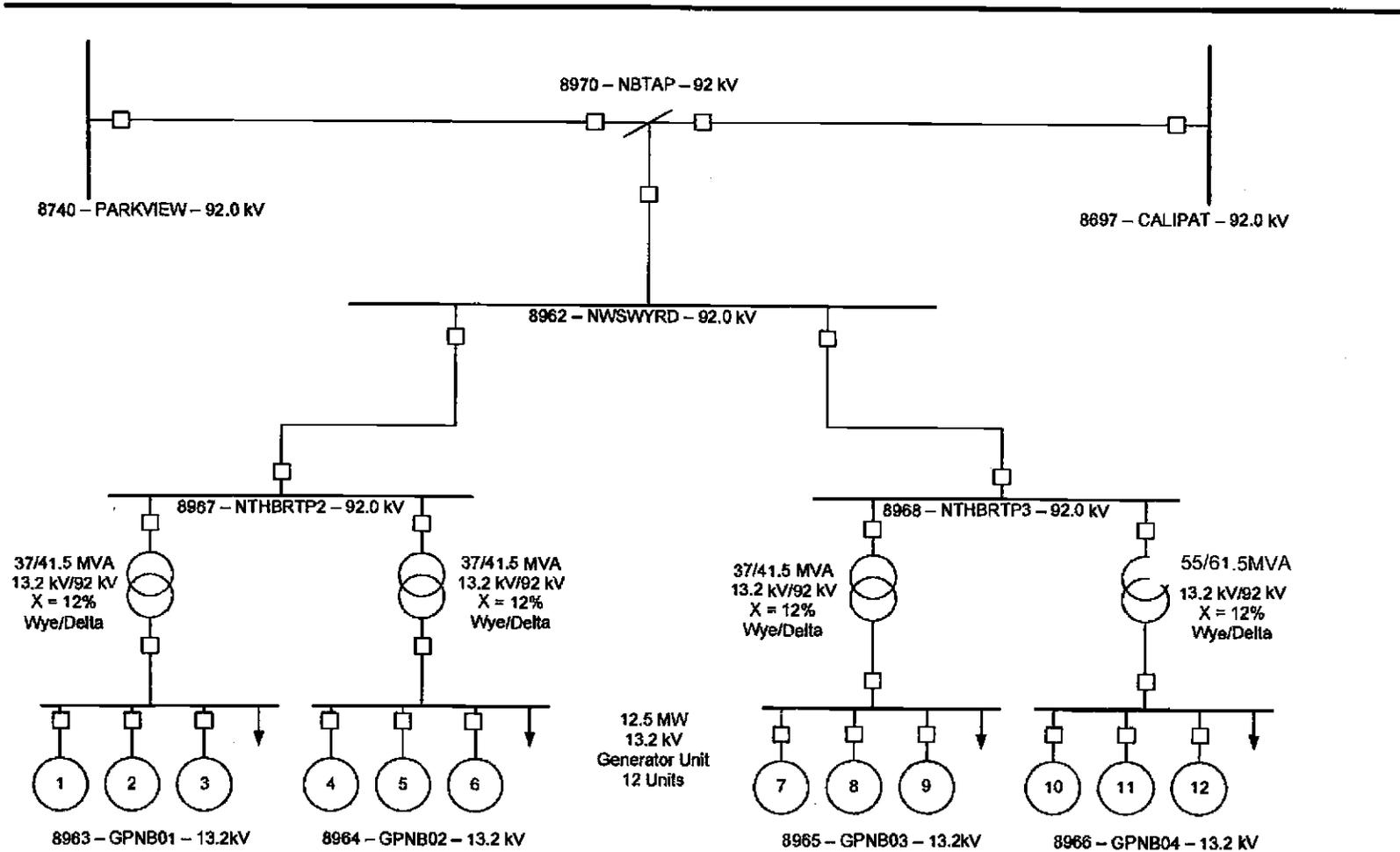


Figure 2. System One-Line Diagram at the Point of Interconnection

*System Impact Study - 150 MW North Brawley Geothermal Project
Interconnection Customer: Ormat Nevada Inc.*

North Brawley HS N-1

Thermal Overload

e	kV	ck	Type	Mva	Outage	Pre	Post	Outage description
B161	161	1	Tran	125	tran_96	95.30%	103.30%	Tran AVE58 92.00 to AV58 161.00 Circuit 1
	161	1	Tran	125	line_4	98.50%	101.60%	Line CVSUB 92.0 to JACKSON 92.0 Circuit 1
	161	1	Tran	125	line_8	97.40%	100.60%	Line AVE58 92.0 to OASIS 92.0 Circuit 1

North Brawley HS N-1
Voltage Deviation

Bus	Name	kV	Area	Zone	Outage	Pre	Post	Outage description
8806	AV58TP1	161	8	162	line_81	0.0478	0.051	Line AV58 161.0 to ELCENTSW 161.0 Circuit 1
8378	SALTCITY	92	8	163	line_8	0.0495	0.0509	Line AVE58 92.0 to OASIS 92.0 Circuit 1

North Brawley HS N-2

Thermal Overload

From	Name	kV	To	Name	kV	ck	Type	Mva	Outage	Pre	Post	Outage description
NONE												

**North Brawley
System Impact Study**



**Appendix C
Off-Peak Light Winter Power Flow Results
Pre and Post Project**

North Brawley LW N-1
Thermal Overload

ID	Name	XY	TS	Wave	IRV	di	IRV	IRV	Q-avg	Tran	Pod	Contd. description
8331	ELCENTSW	161	8335	ELSTEAMP	92	1	Tran	125	line_42	77.8%	107.8%	Line ELCENTSW 230.0 to IMPRLVLY 230.0 Circuit 1

North Brawley LW N-1
Voltage Deviation

Bus	Name	kV	Area	Zone	Outage	Pre	Post	Outage description
NONE								

North Brawley LW N-2
Thermal Overloading

From	Name	kV	To	Name	kV	ck	Type	Mva	Outage	Pre	Post	Outage description
NONE												

**North Brawley
System Impact Study**



**Appendix D
Peak Heavy Summer Transient Stability Plots
Post Project**

APPENDIX D

Stability Plots for Heavy Summer Case: HS-W

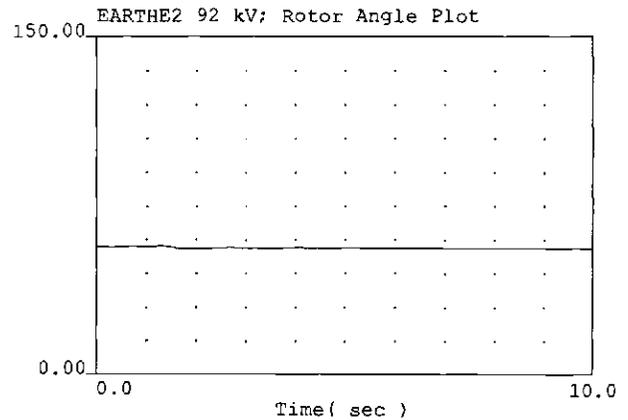
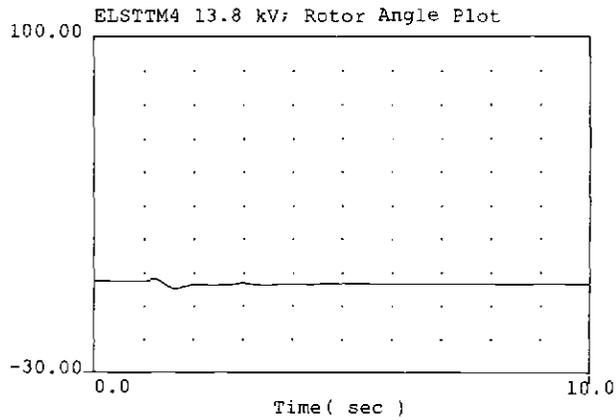
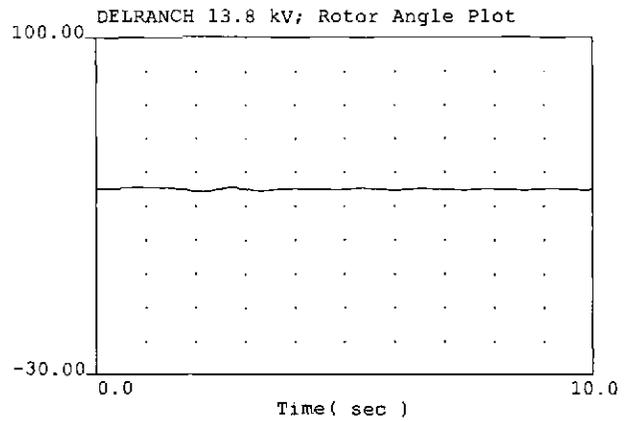
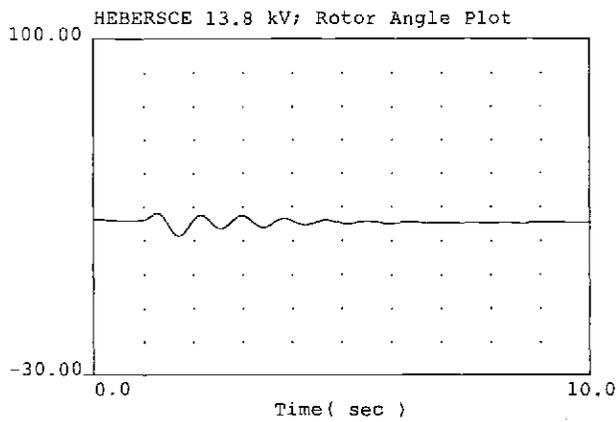
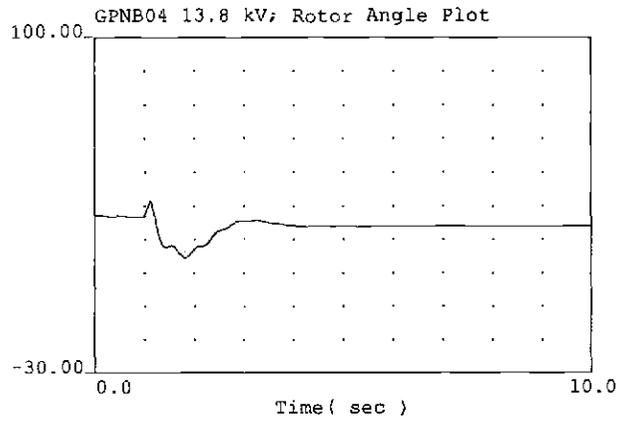
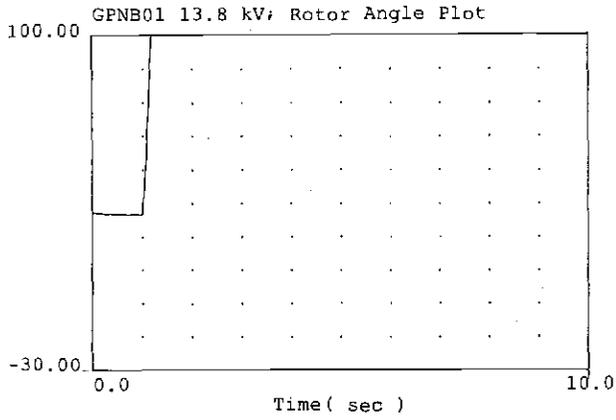
Each case contains the following:

- **Rotor angle plot**
- **Bus voltage plot**
- **Frequency plot**

Summary of High Summer Cases

Item#	Case Description
	<u>Normal Fault Clearing Cases</u>
A1	3-phase fault at bus 8963, fault cleared by tripping generators 1 to 3.
A2	3-phase fault at bus 8967, fault cleared by tripping generators 1 to 6.
A3	3-phase fault at bus 8962, fault cleared by tripping generators 1 to 12.
A4	3-phase fault at bus 8970, fault cleared by tripping generators 1 to 12.
A5	3-phase fault at bus 8740, fault cleared by tripping line between buses
A6	8740 to 8970. 3-phase fault at bus 8697, fault cleared by tripping line between buses 8697 to 8970.
	<u>Back up Fault Clearing Cases</u>
B1	3-phase fault at bus 8963, 8cy fault cleared by tripping generators 1 to 3. Stuck breaker#13.
B2	3-phase fault at bus 8967, 8 cy fault cleared by tripping generators 1 to 6. Stuck breaker#21.
B3	3-phase fault at bus 8962, 8 cy fault cleared by tripping generators 1 to 12. Stuck breaker#25.
B4	3-phase fault at bus 8970, 8 cy fault cleared by tripping generators 1 to 12. Stuck breaker#27. Trip line between buses (8970 to 8697) in 15 cycles.
B5	3-phase fault at bus 8740, 8 cy fault cleared by tripping line between buses 8740 to 8980. Trip line between buses (8740 to 8970) in 15 cycles.
B6	3-phase fault at bus 8697, fault cleared by tripping line between buses 8697 to 8936. Trip line between buses (8740 to 8697) in 15 cycles.

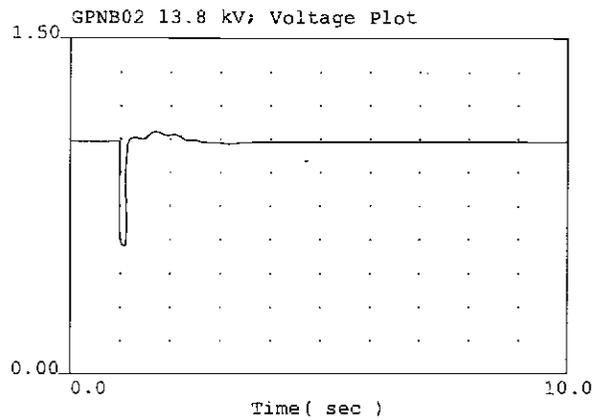
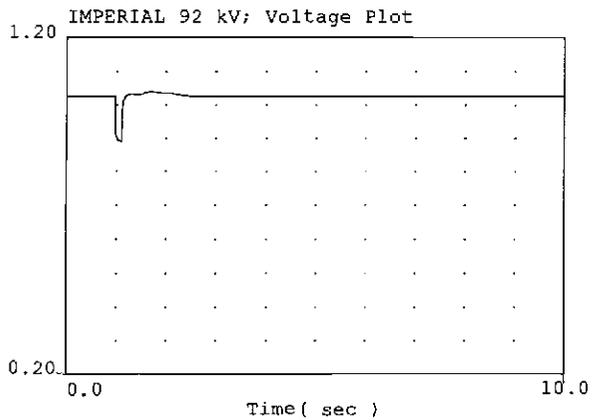
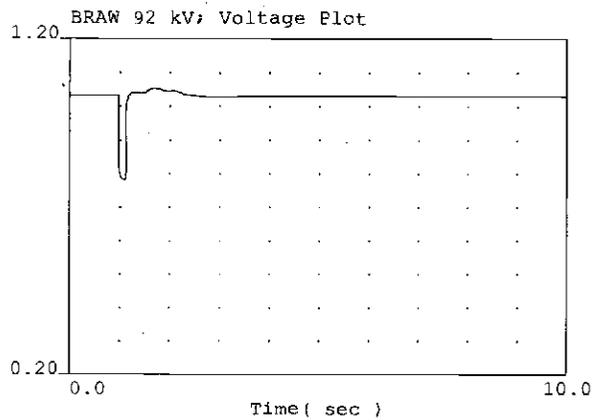
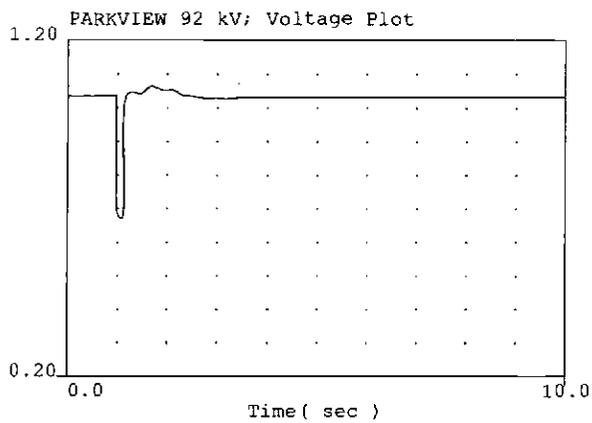
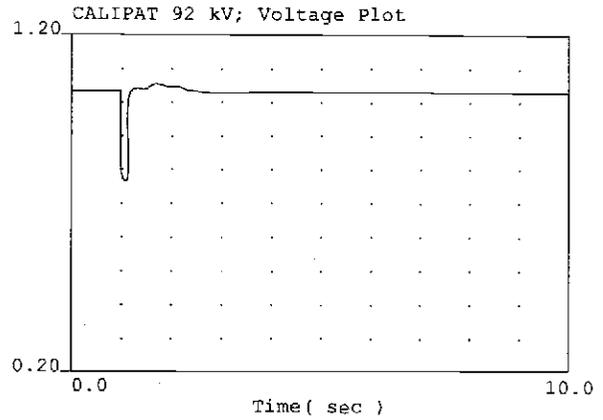
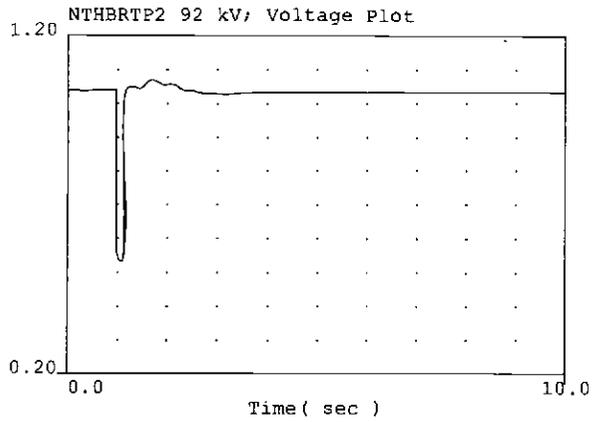
150 MW North Brawley Geothermal Project



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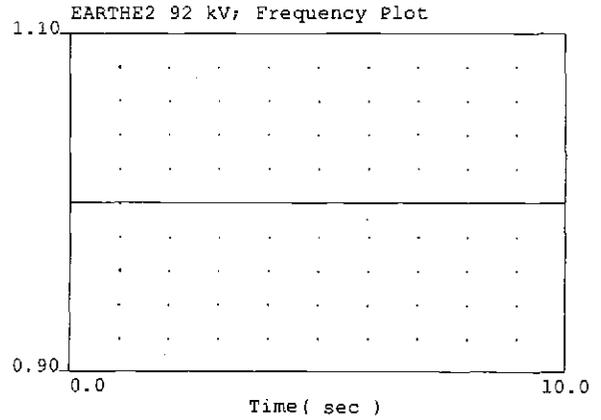
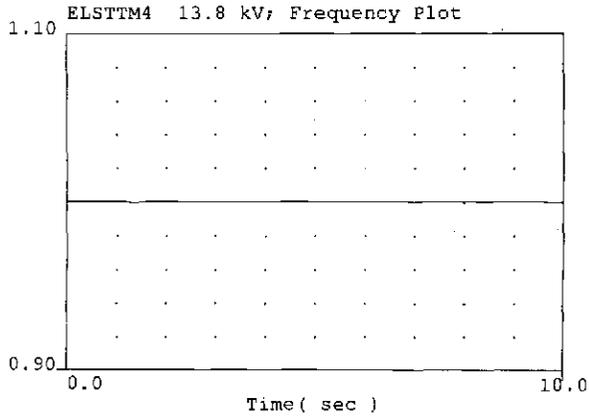
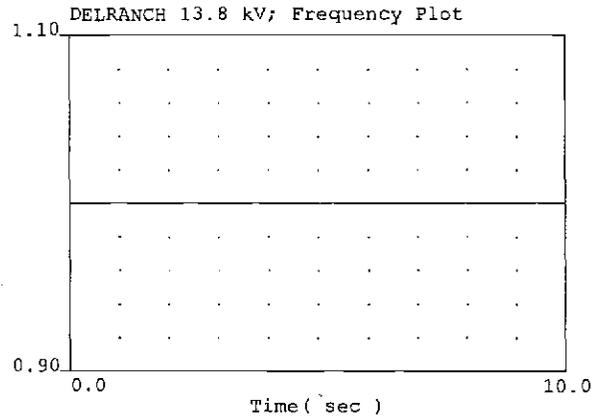
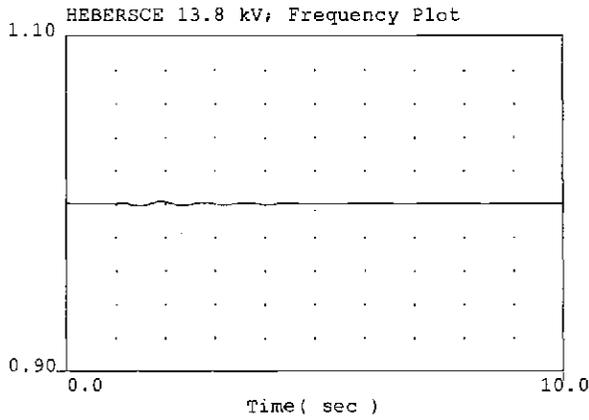
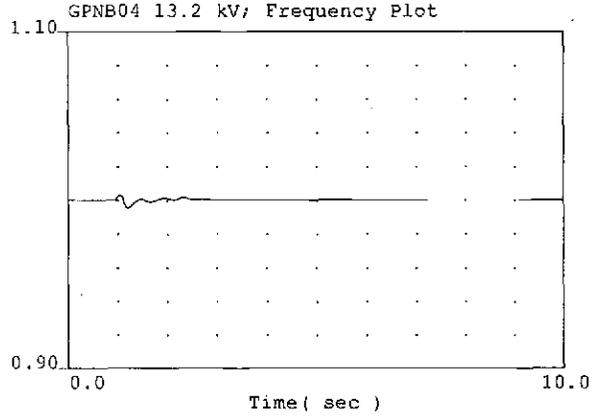
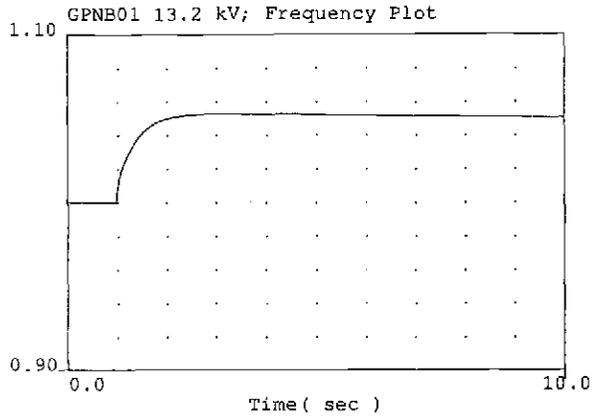
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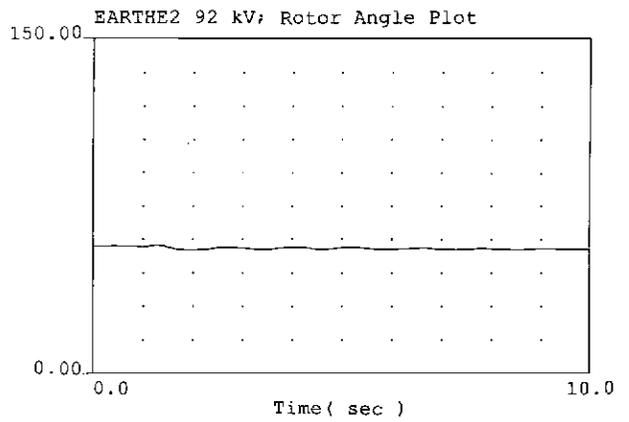
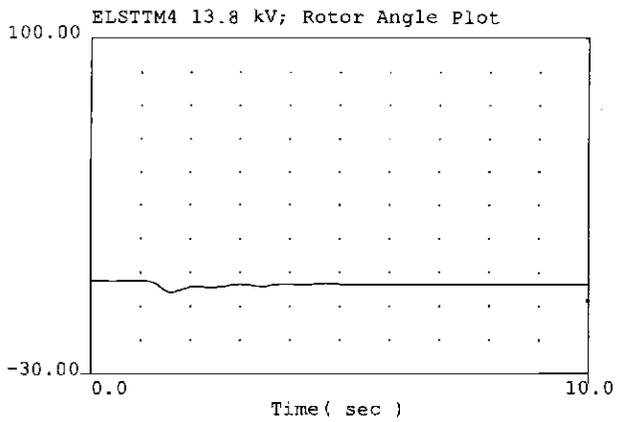
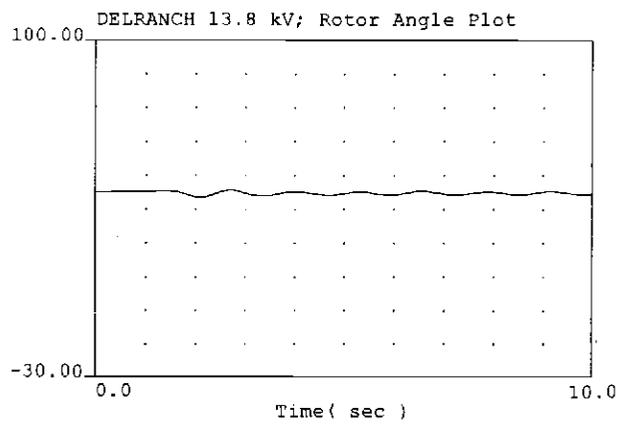
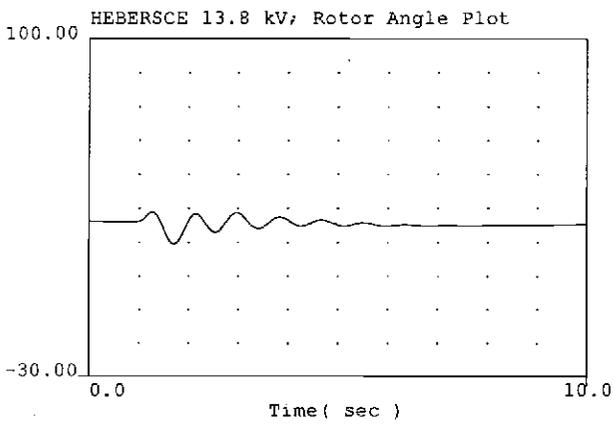
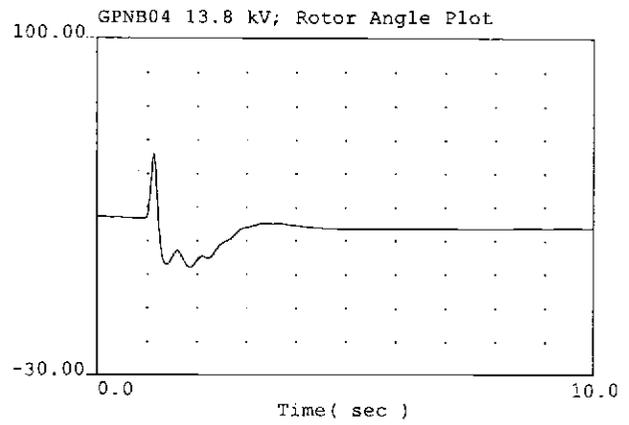
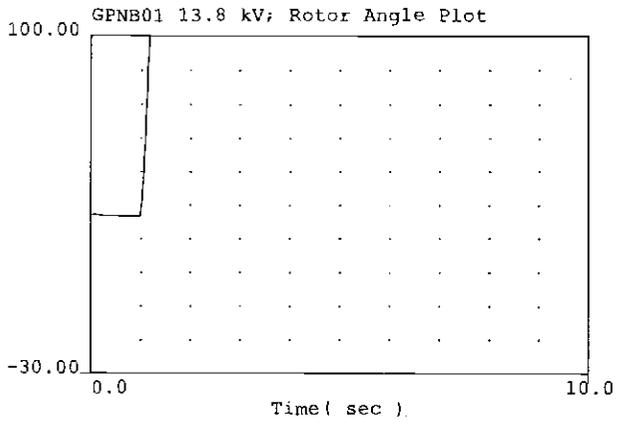
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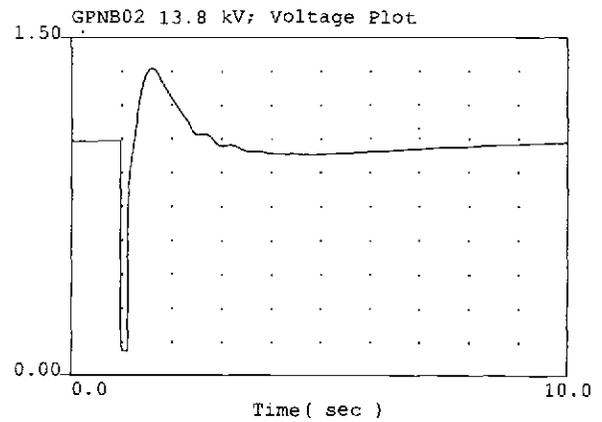
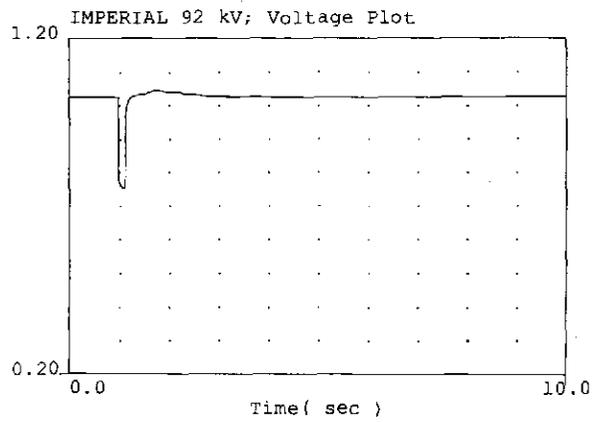
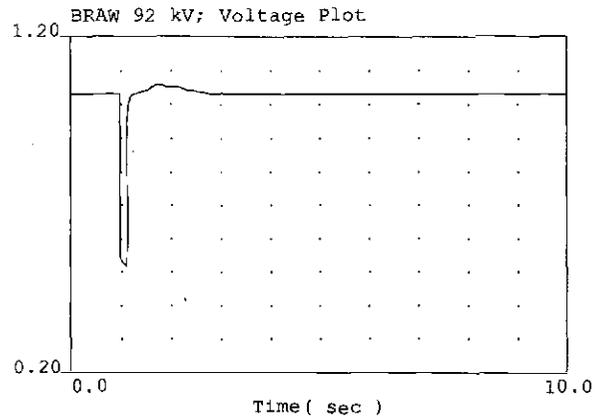
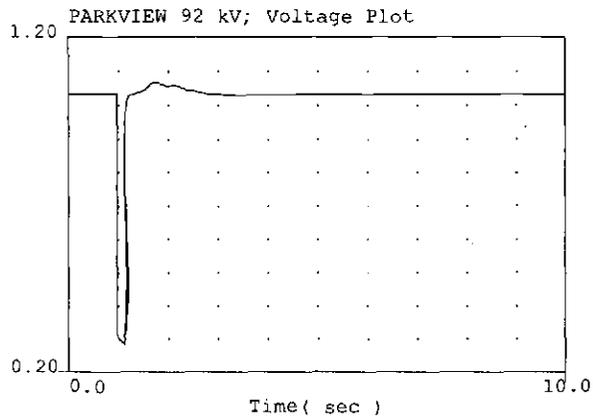
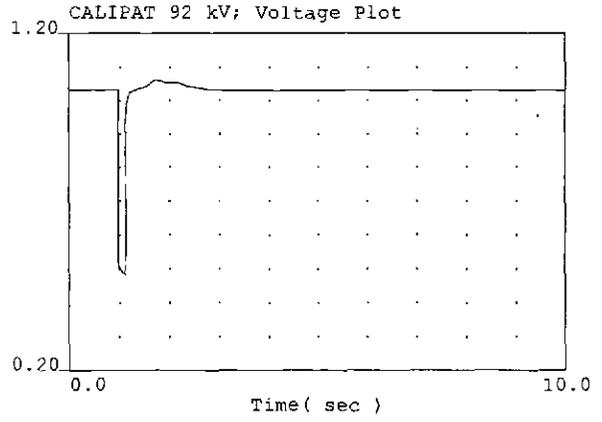
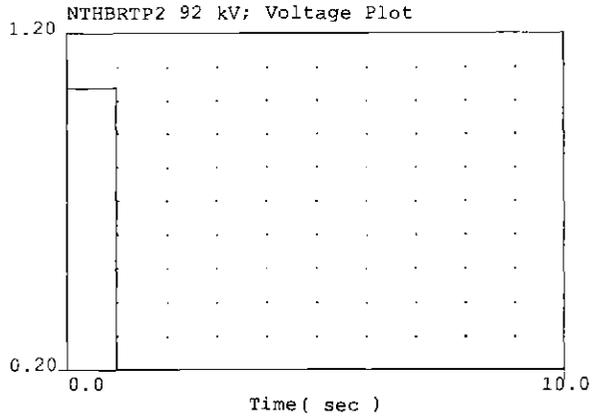
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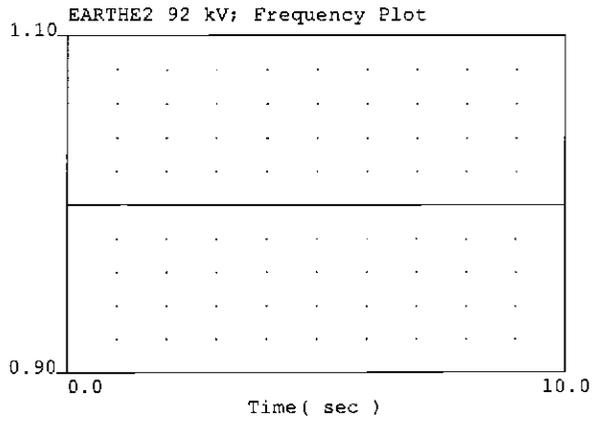
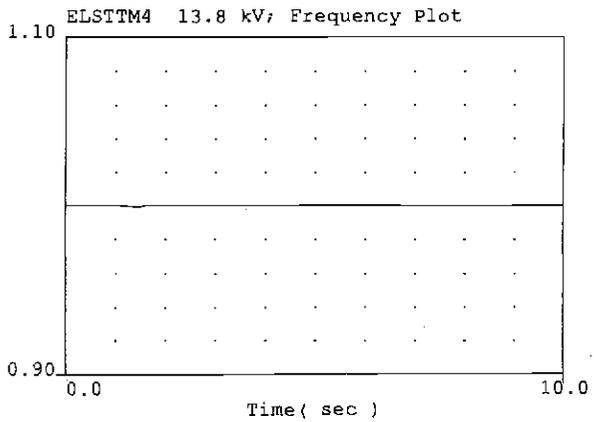
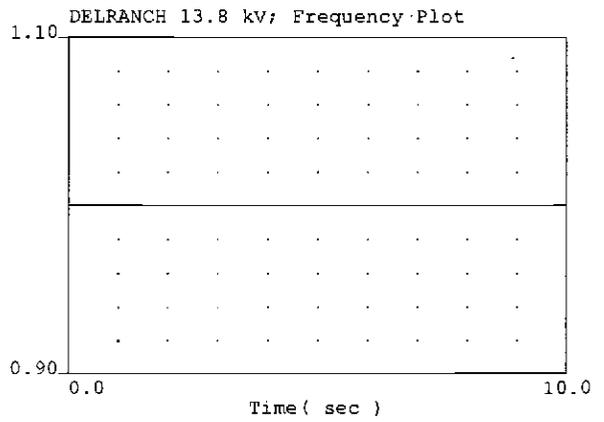
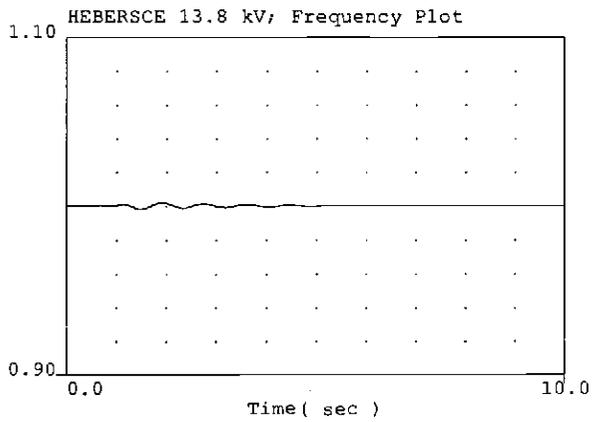
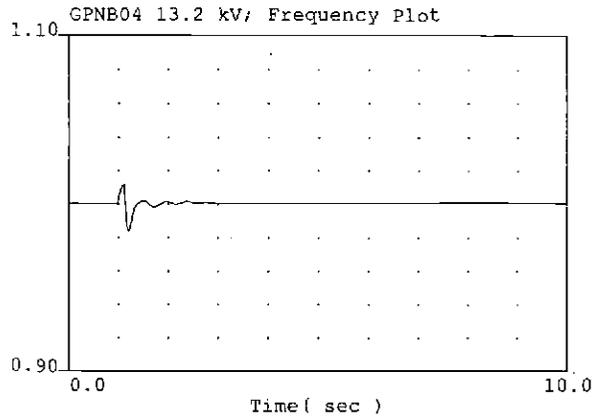
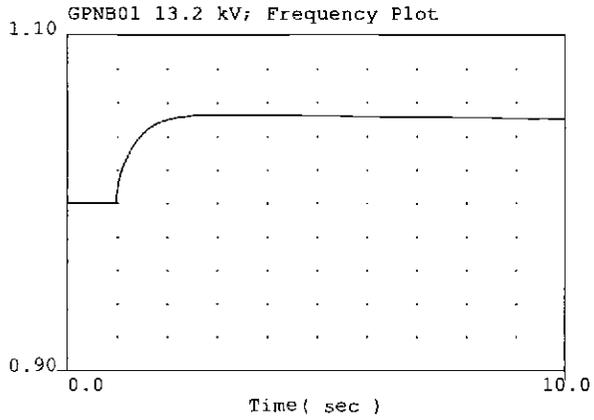
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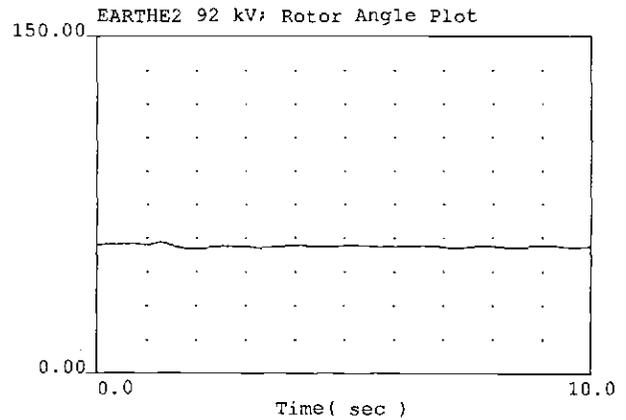
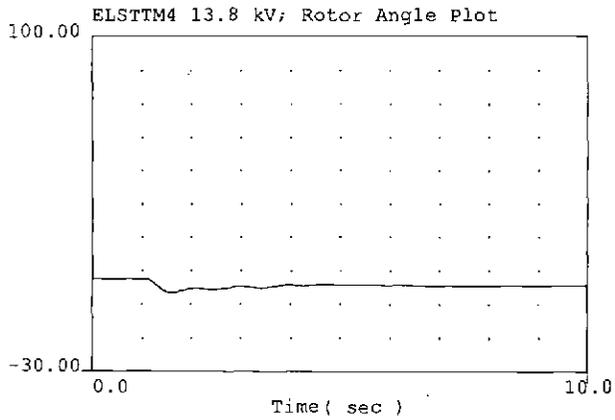
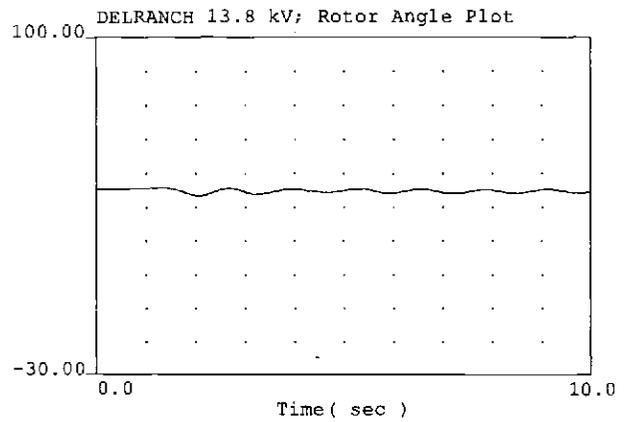
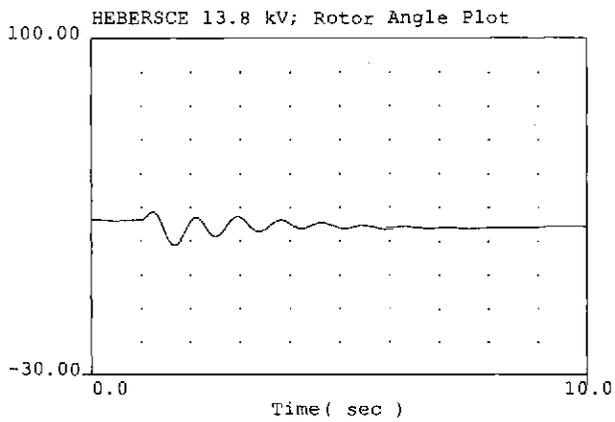
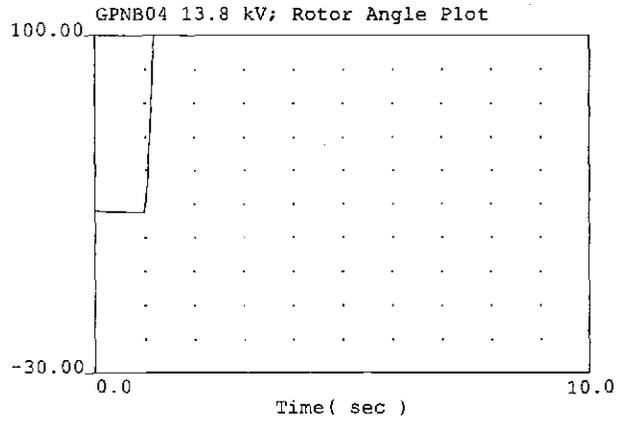
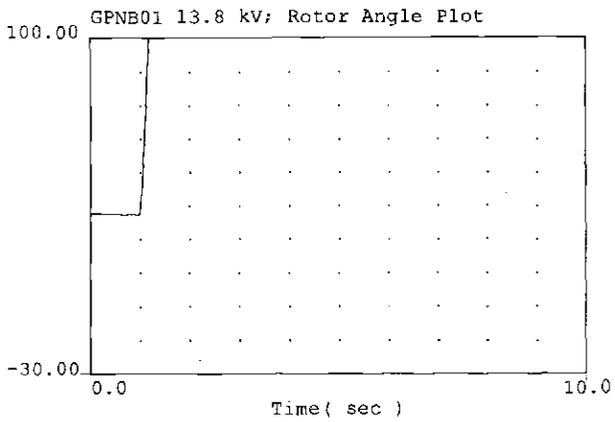
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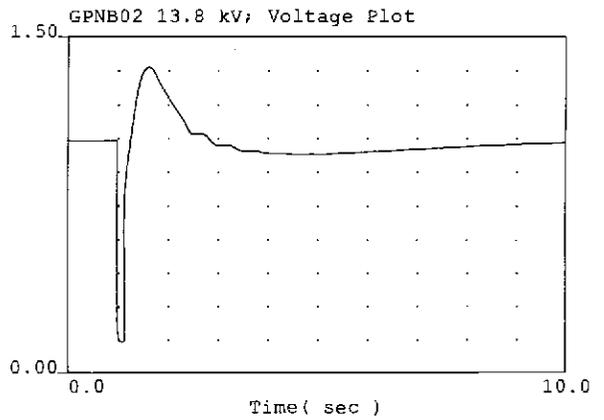
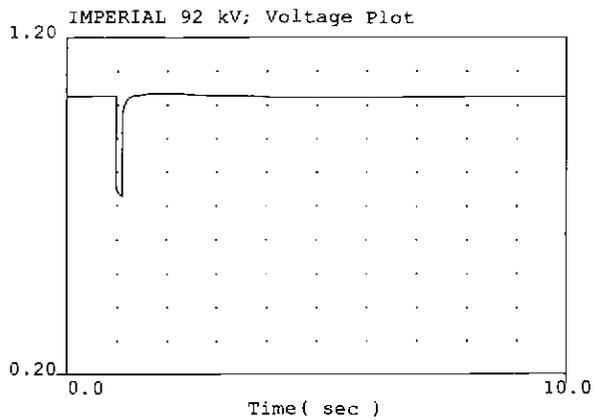
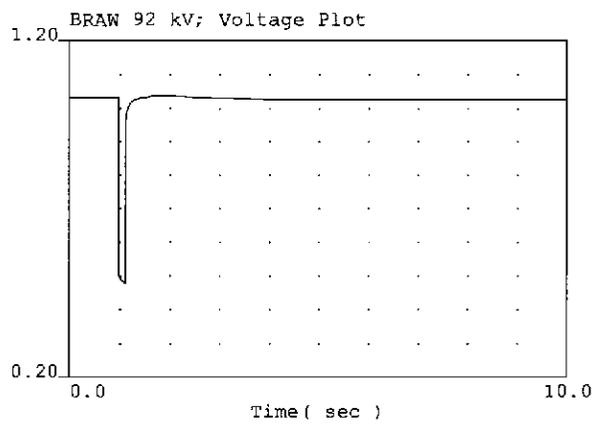
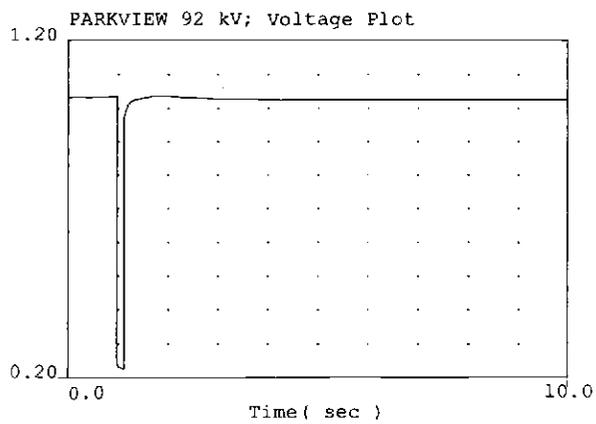
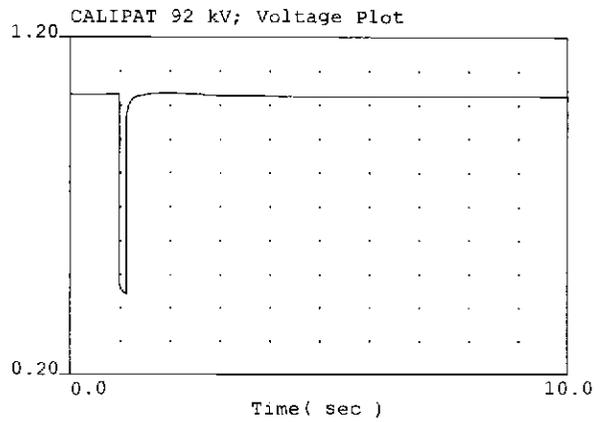
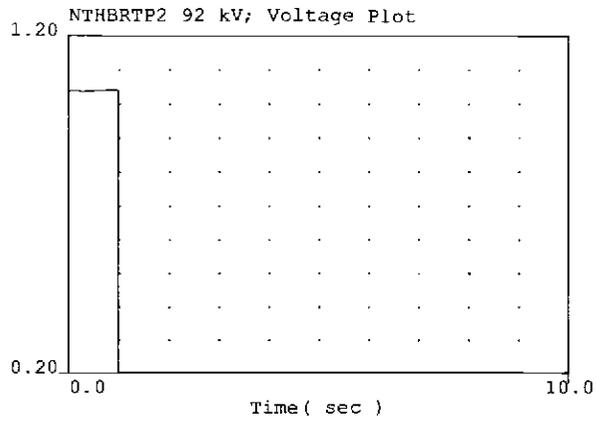
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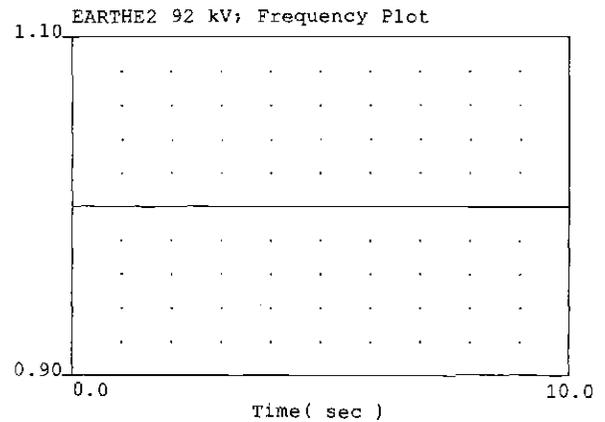
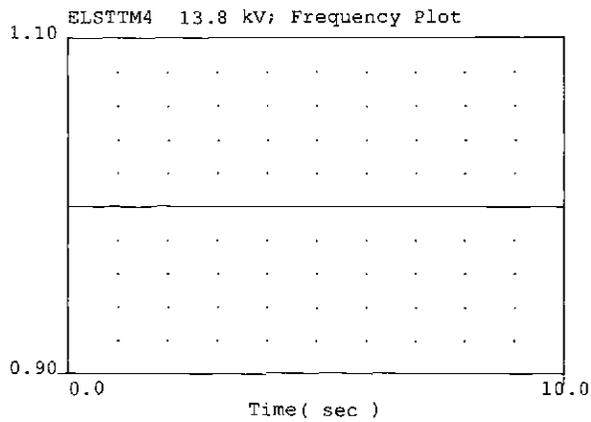
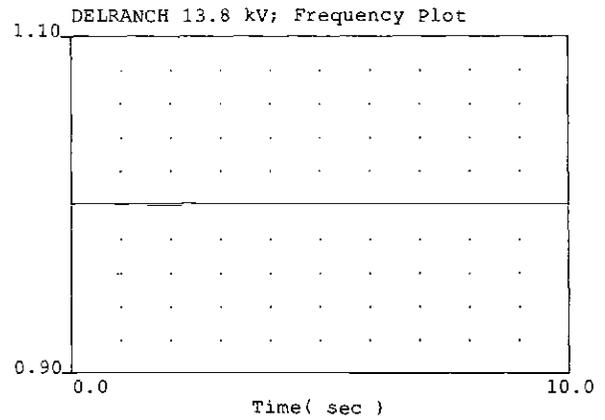
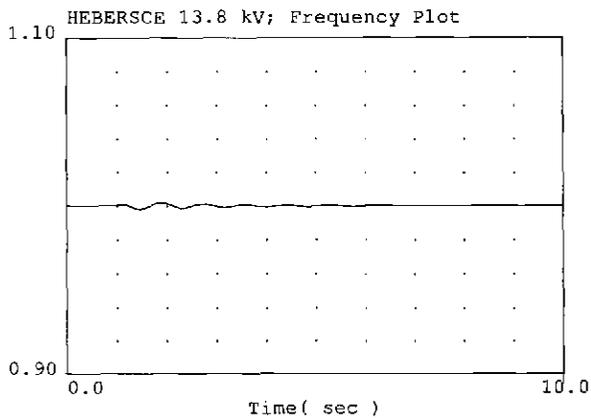
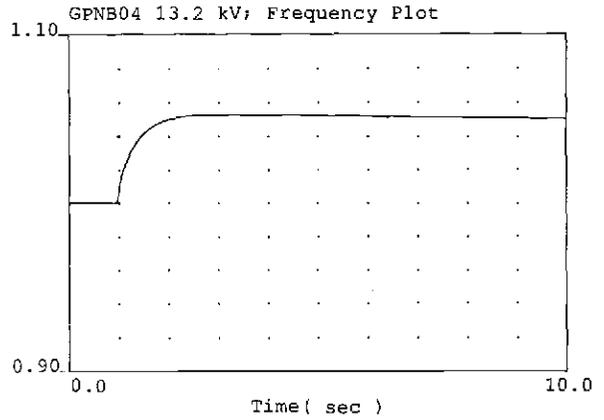
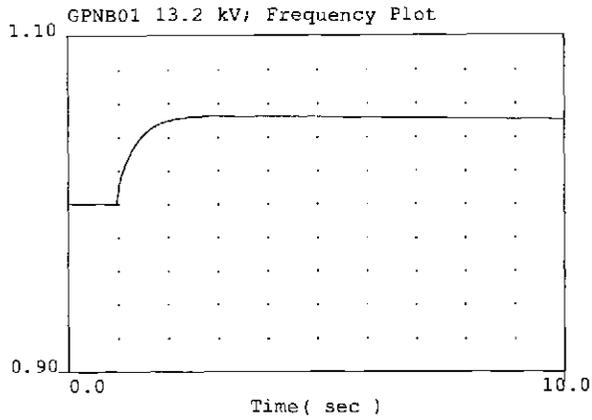
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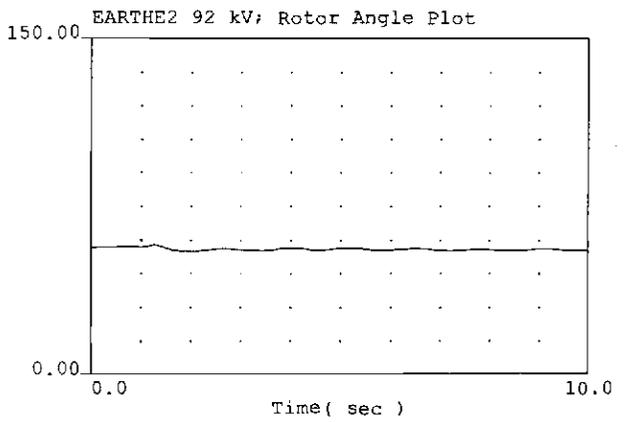
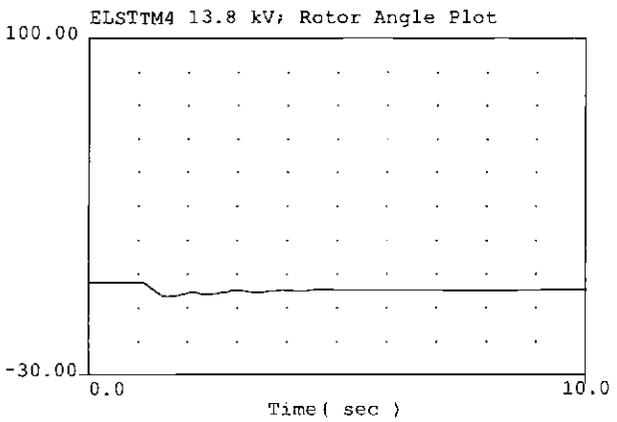
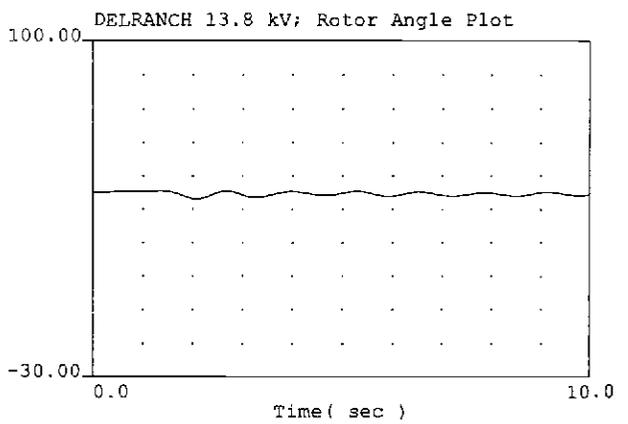
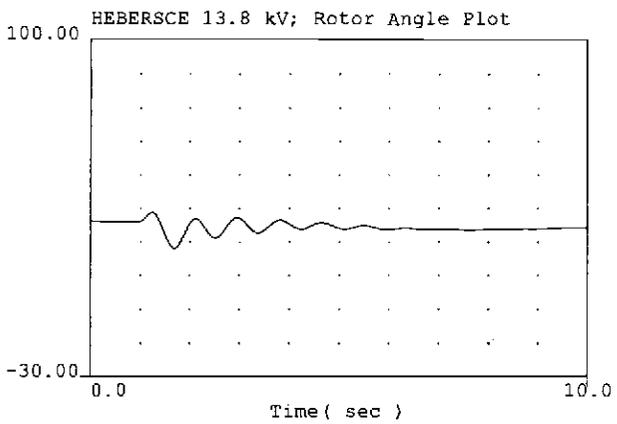
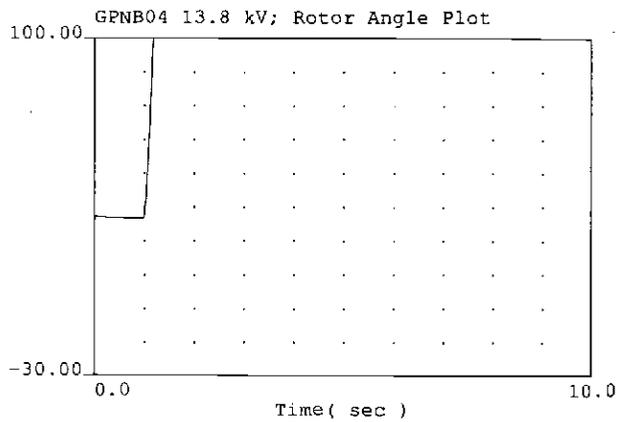
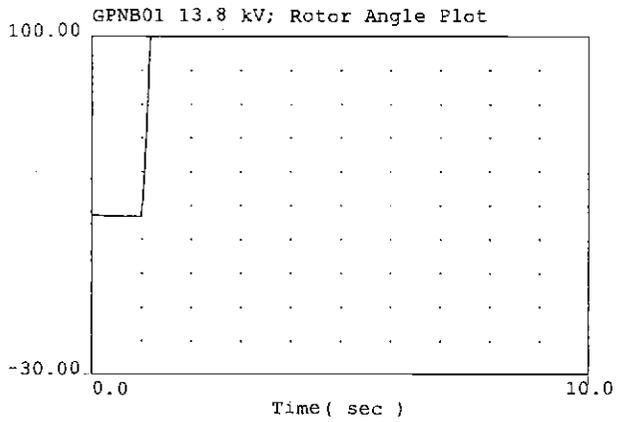
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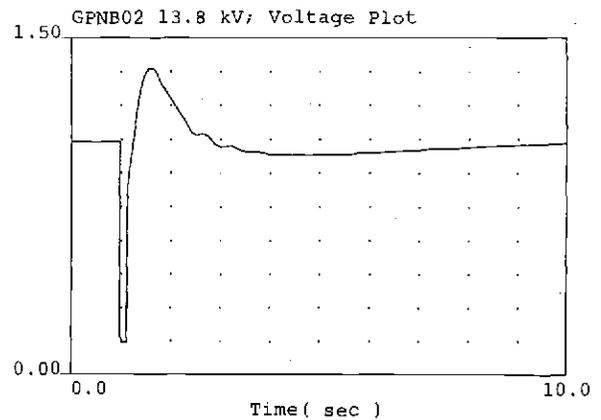
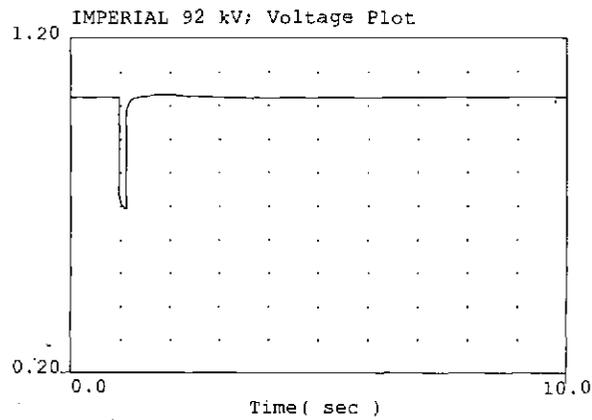
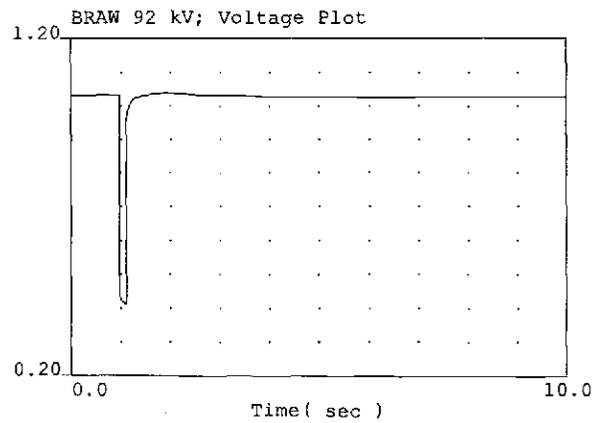
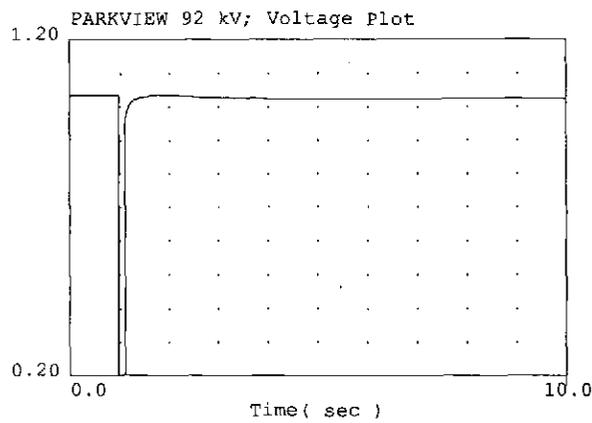
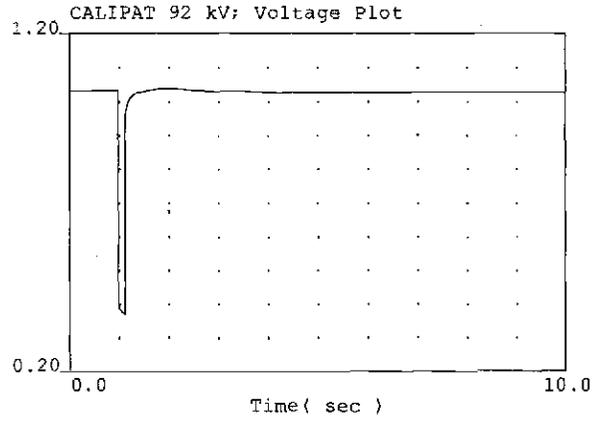
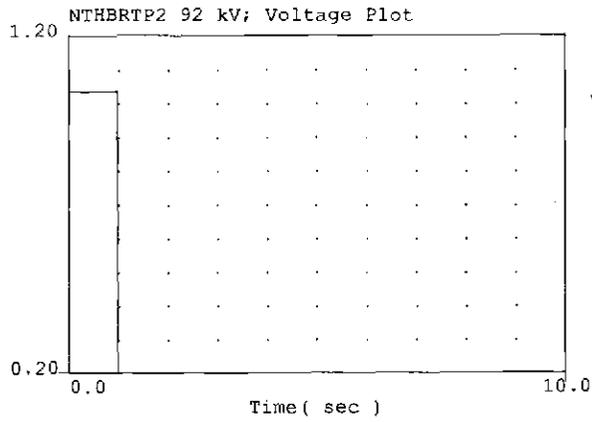
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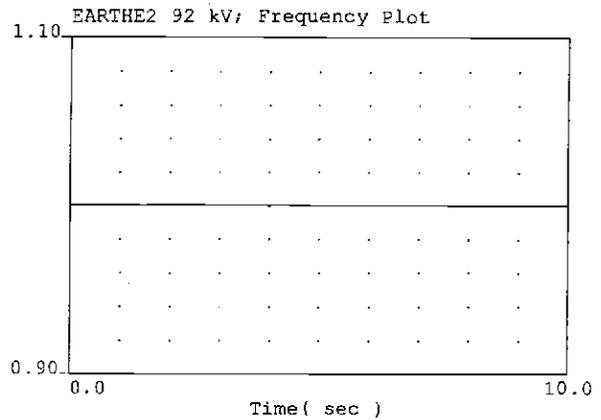
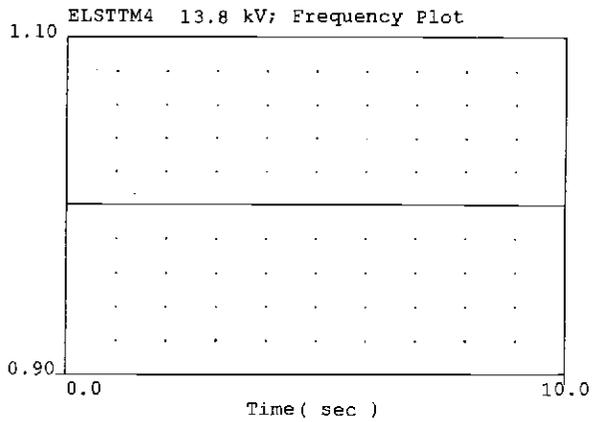
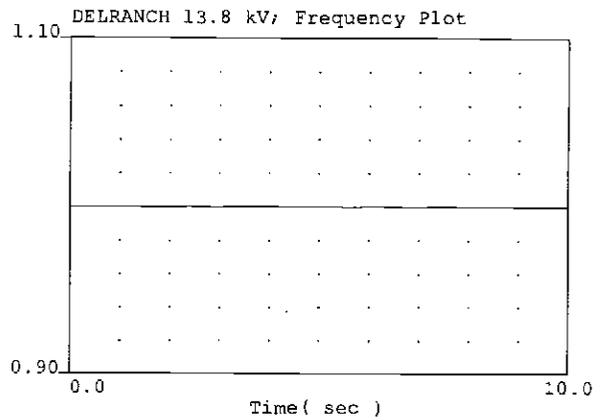
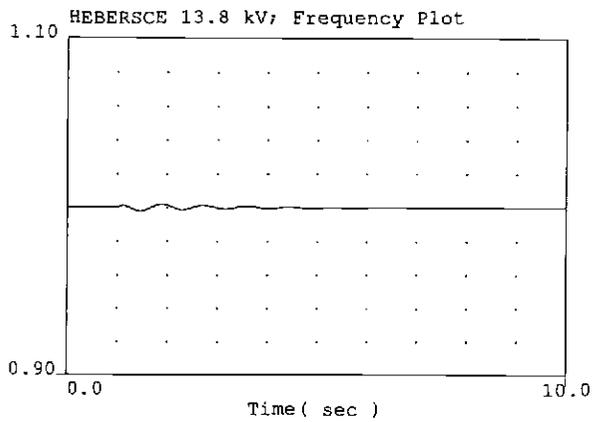
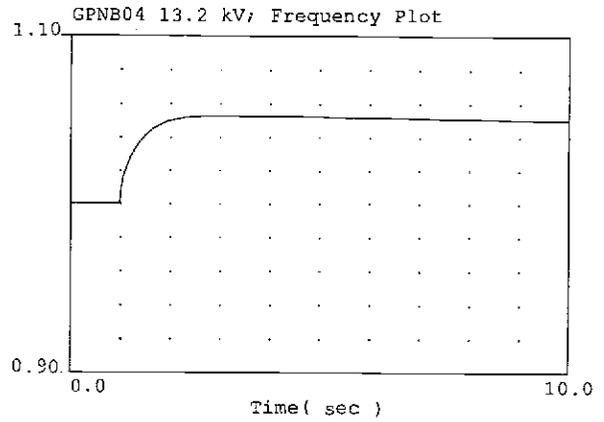
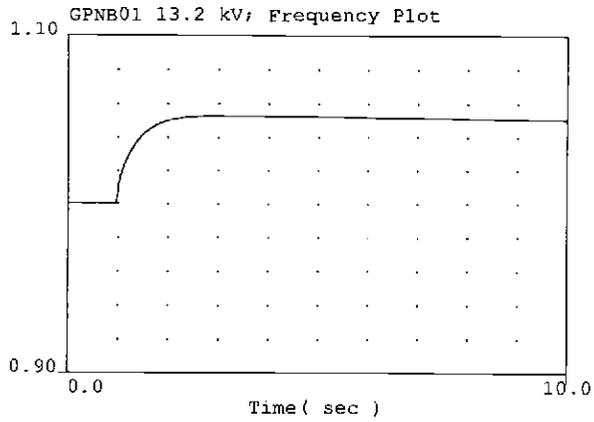
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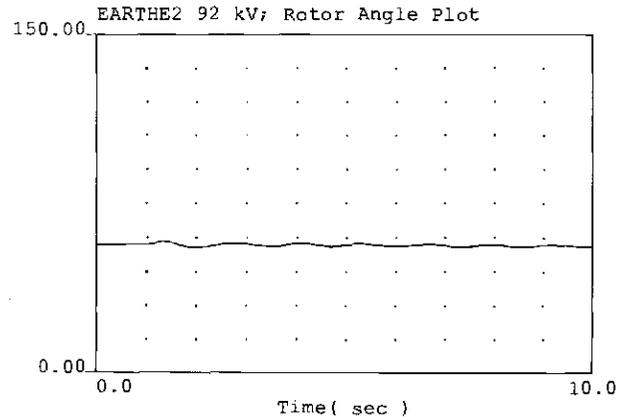
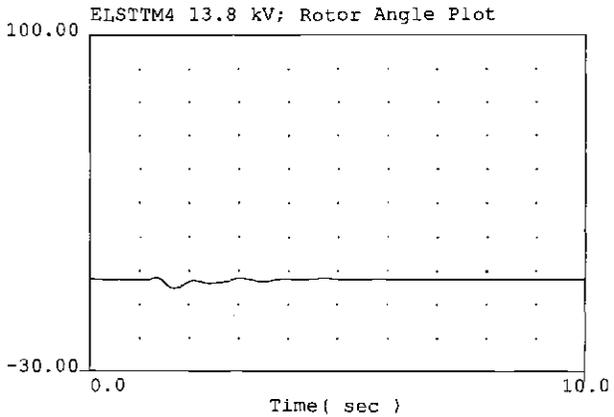
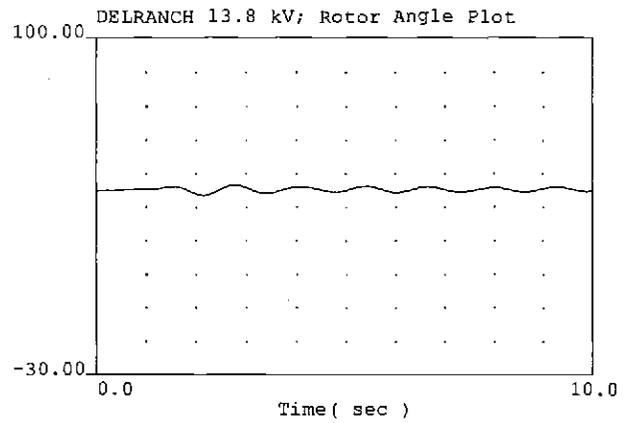
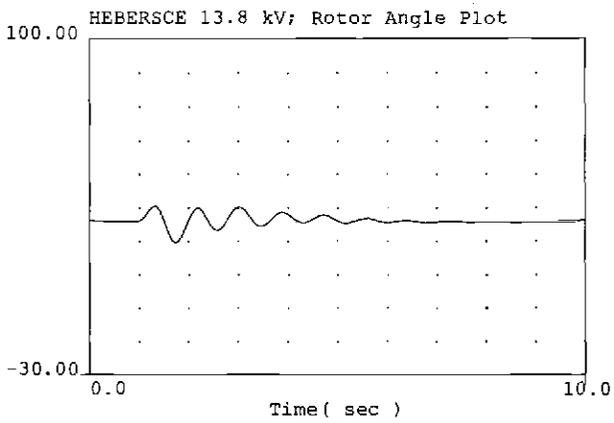
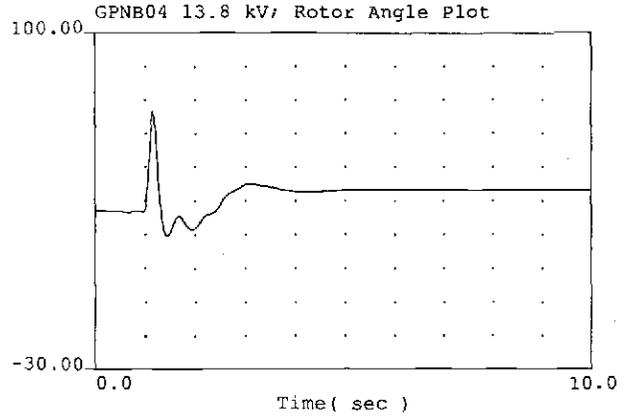
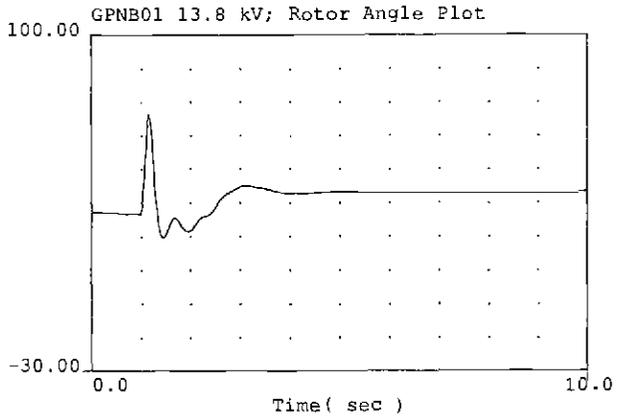
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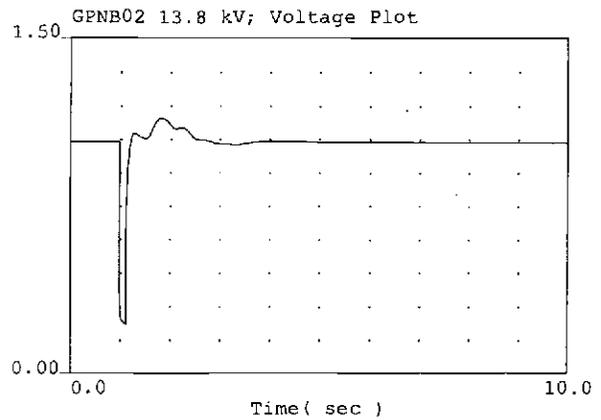
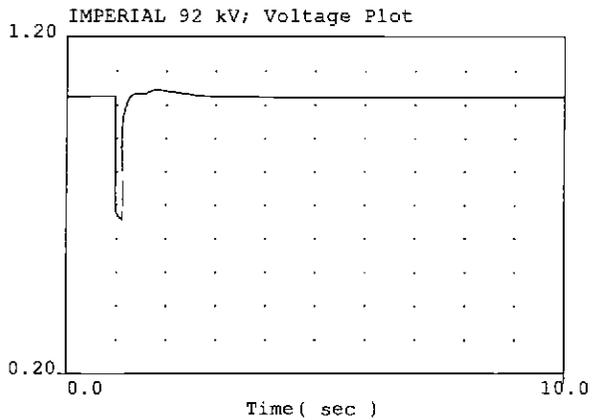
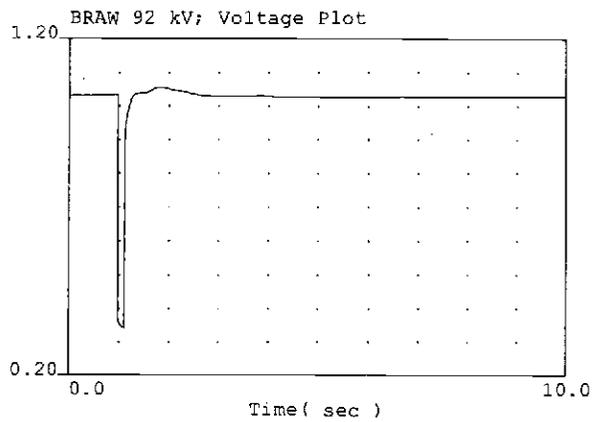
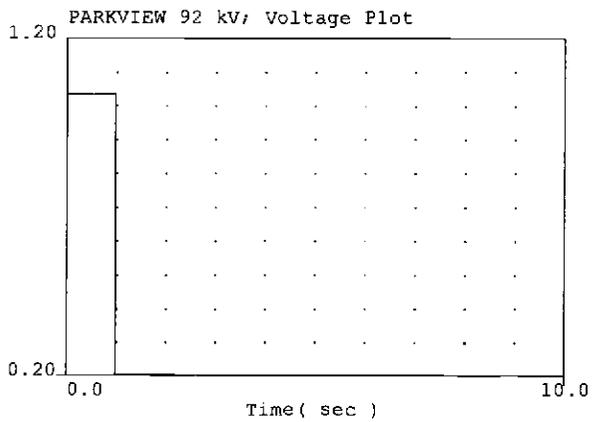
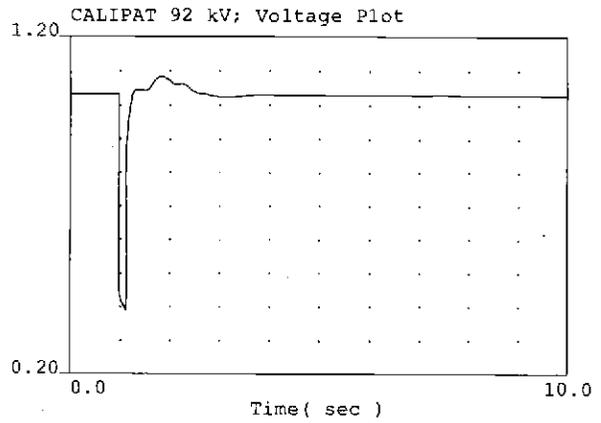
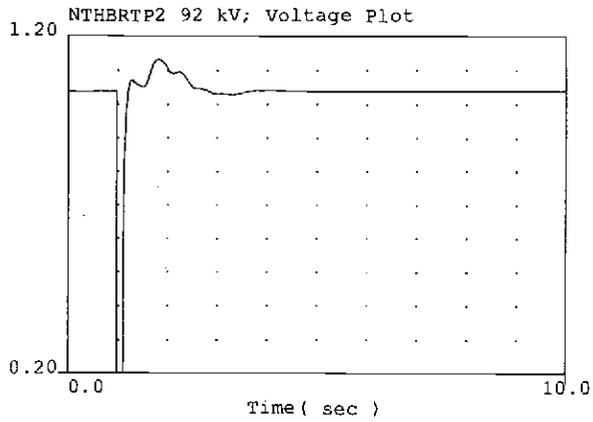
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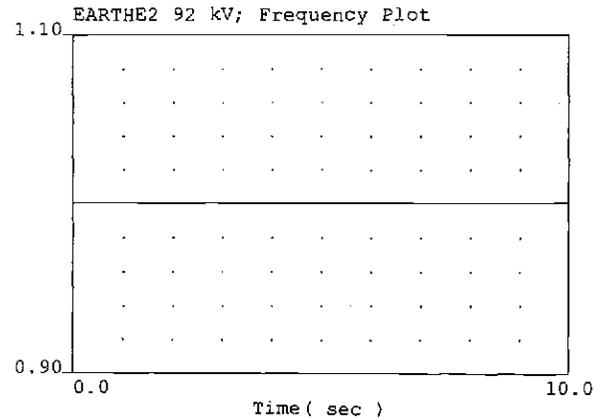
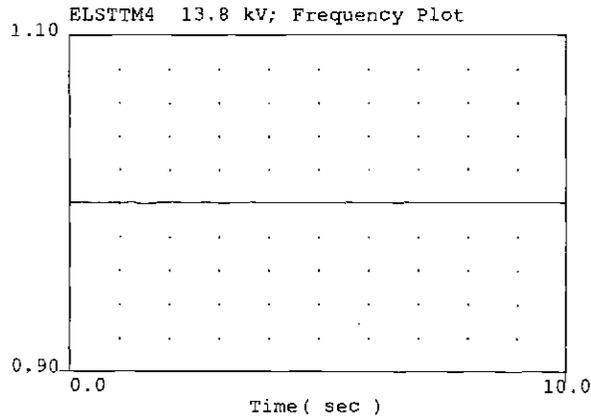
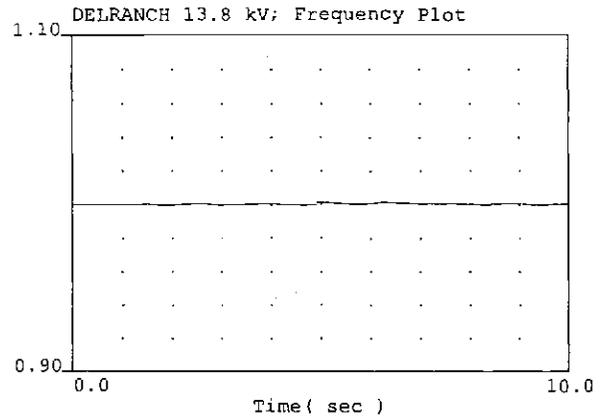
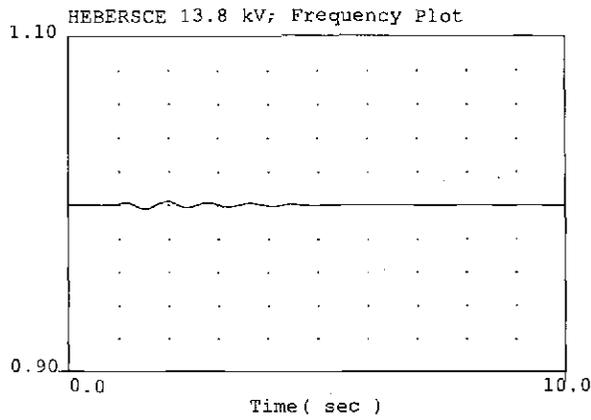
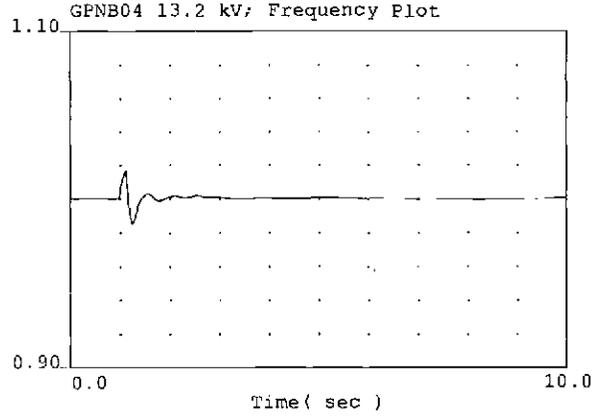
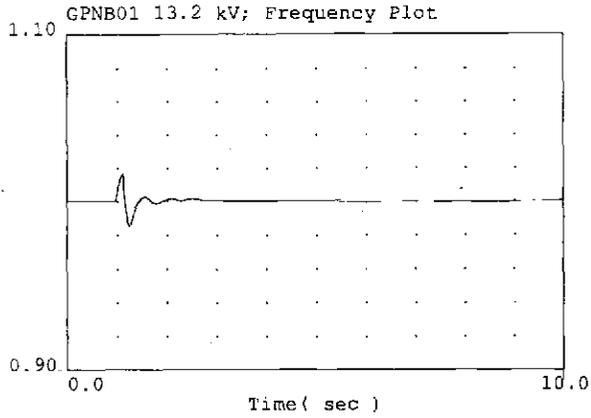
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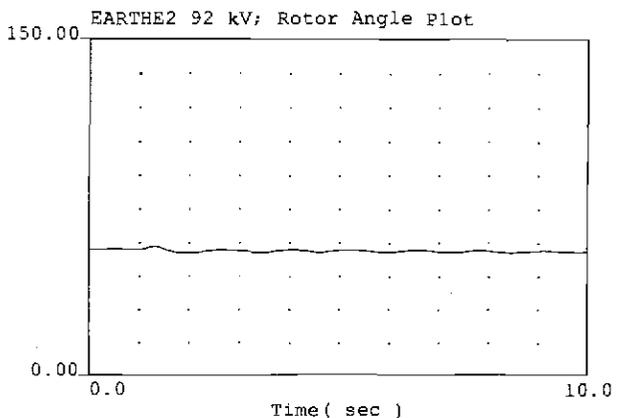
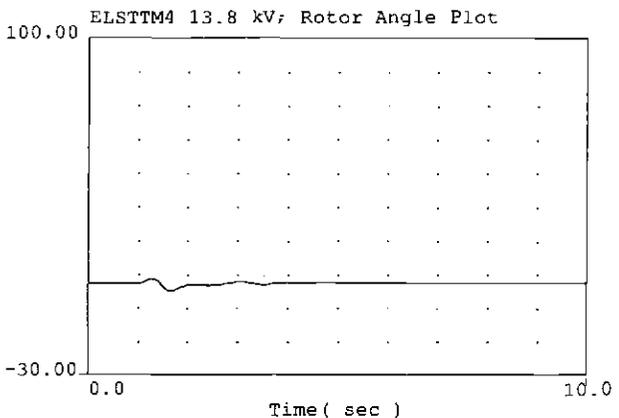
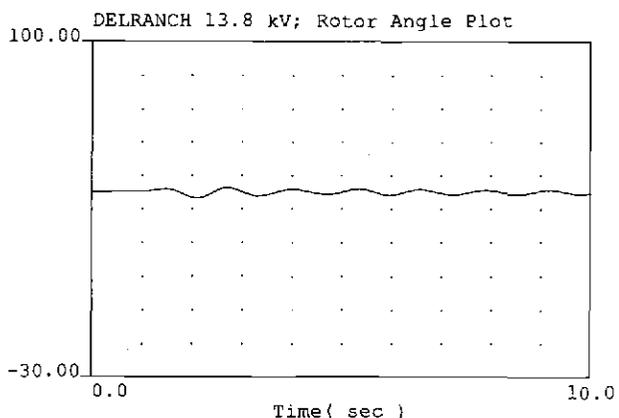
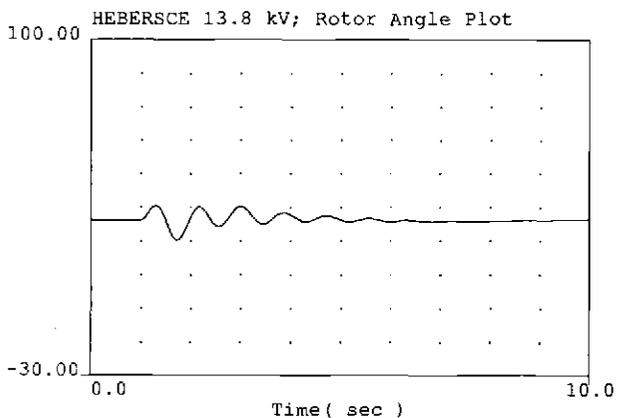
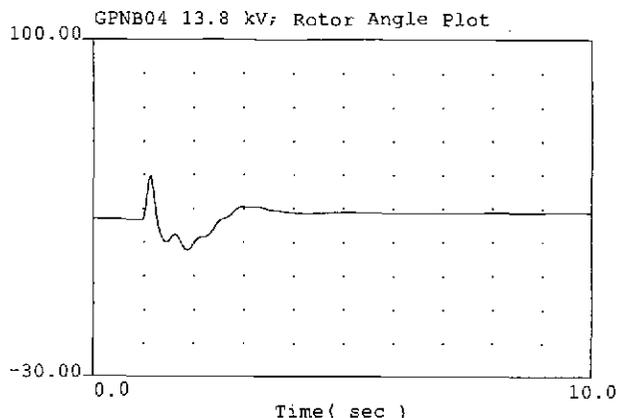
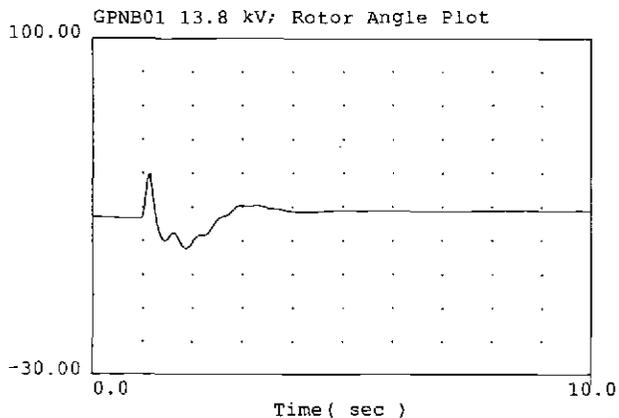
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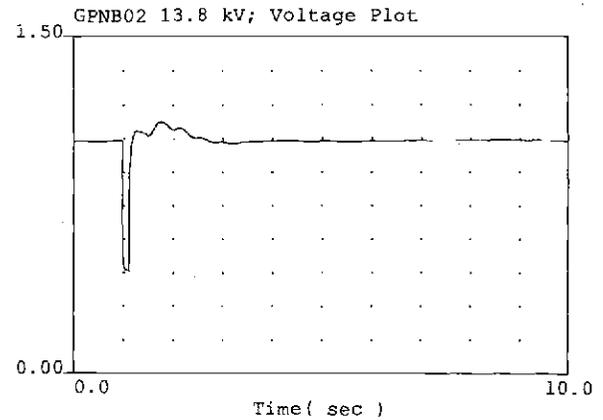
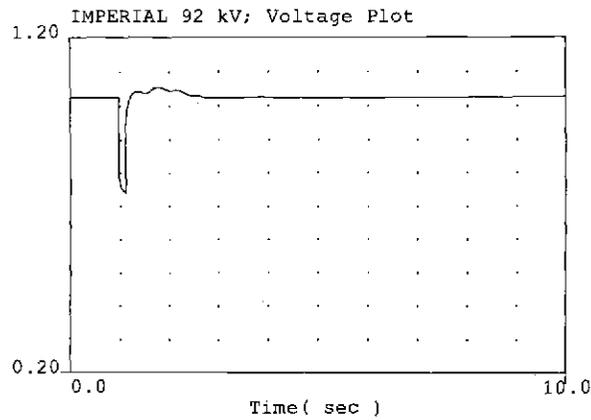
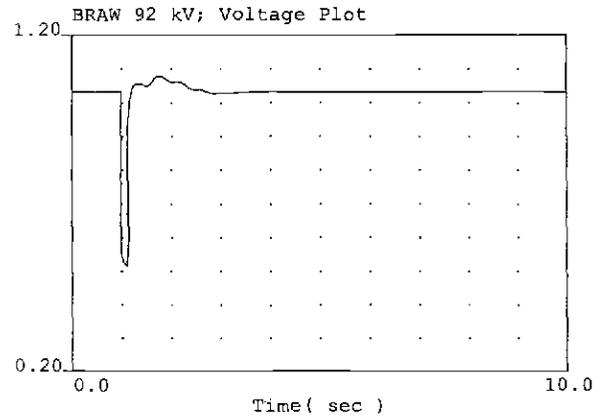
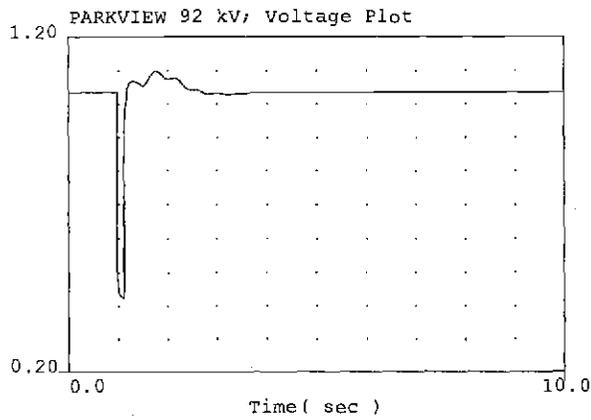
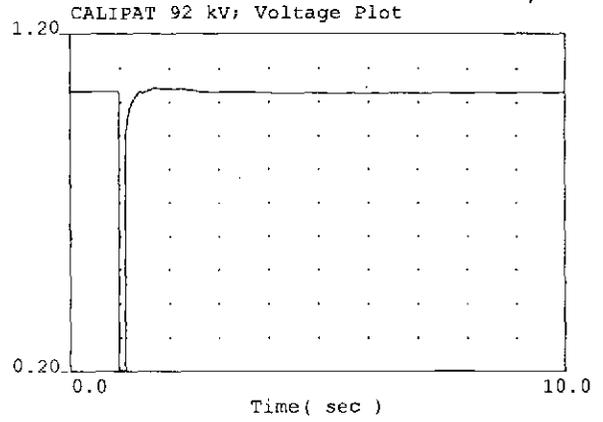
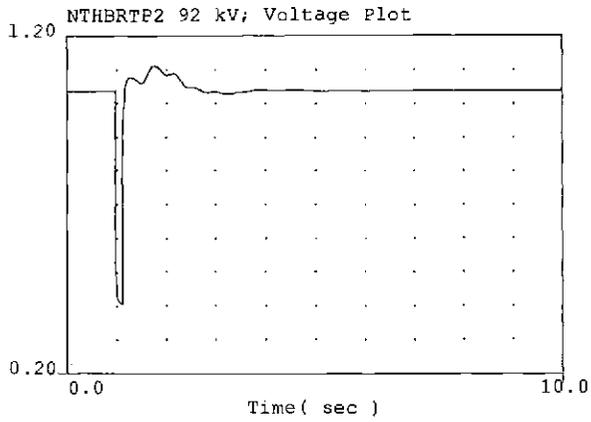
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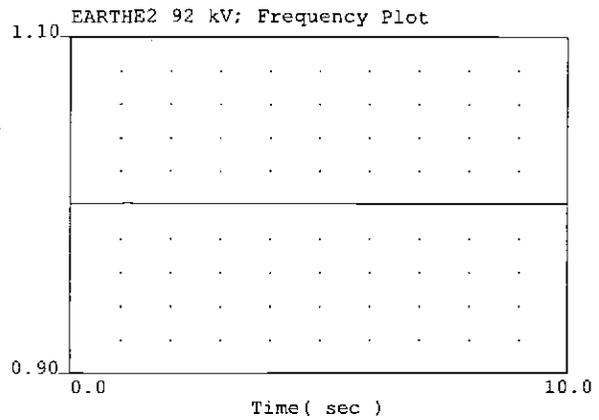
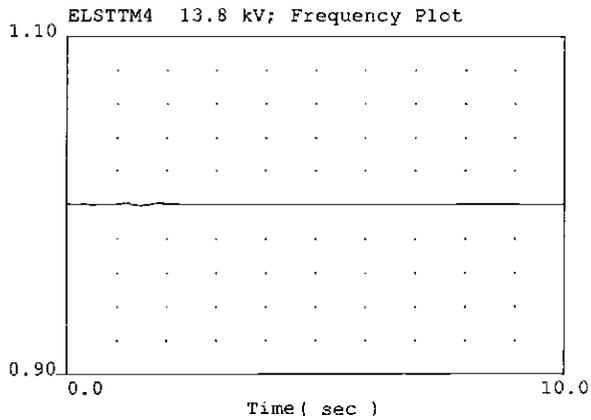
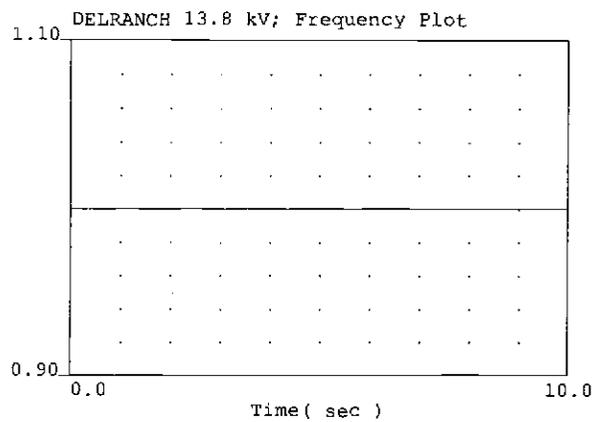
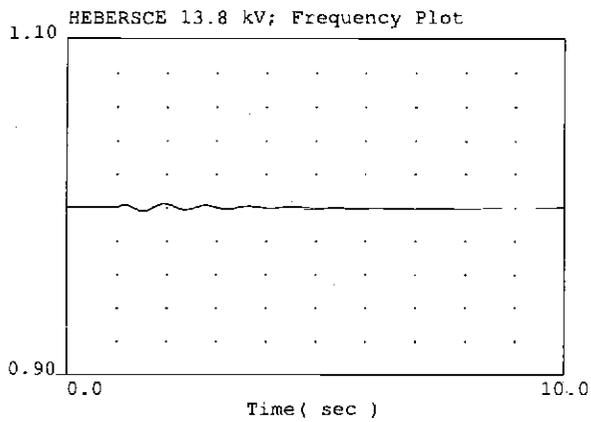
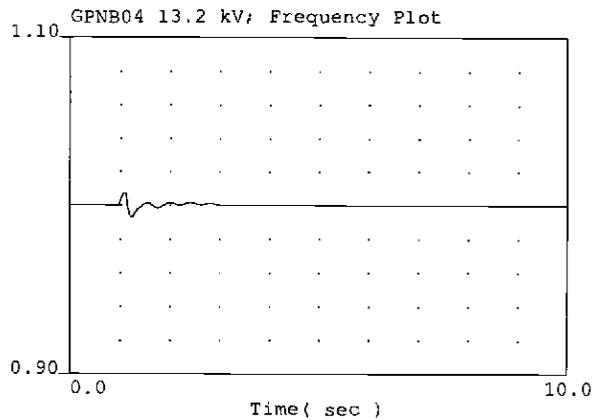
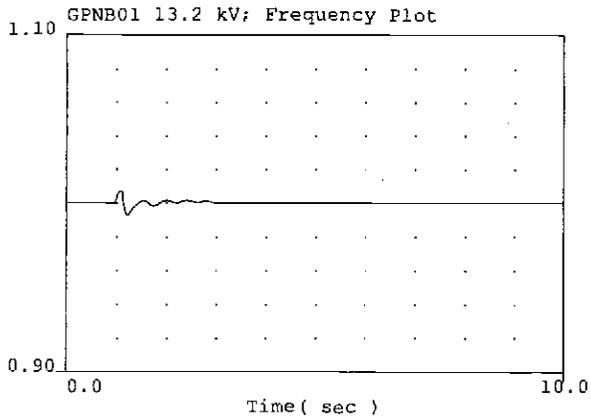
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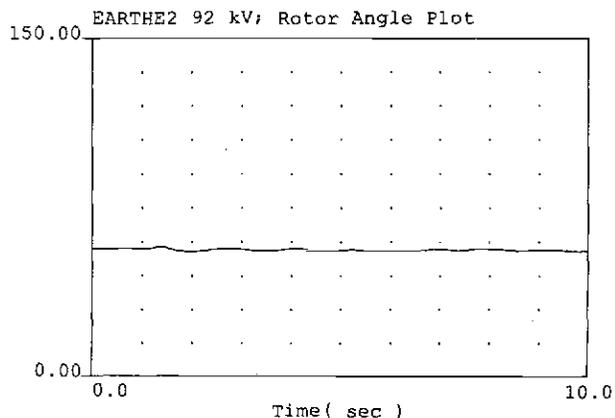
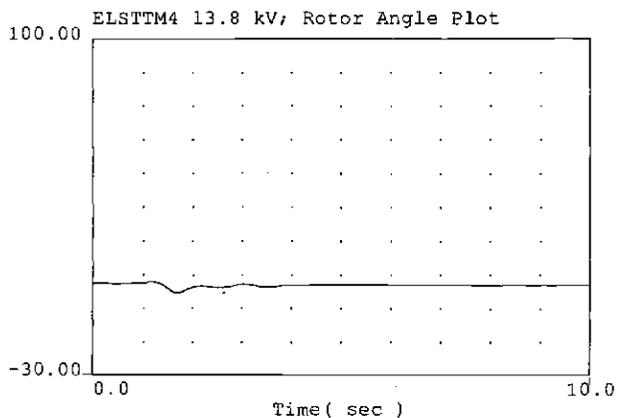
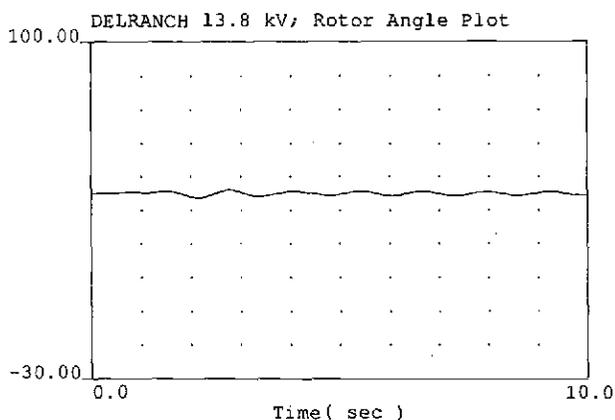
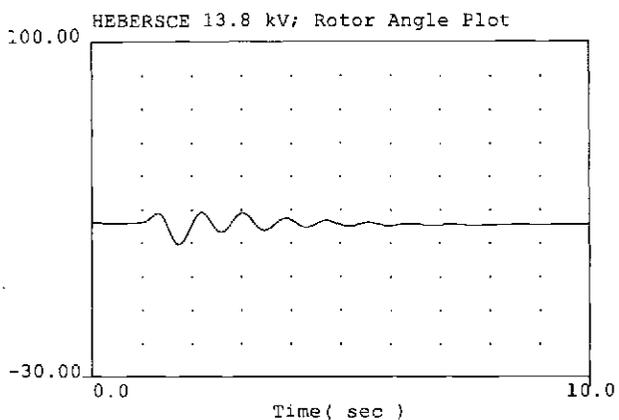
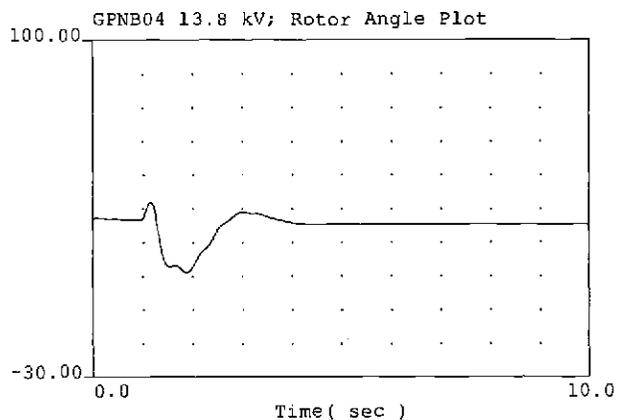
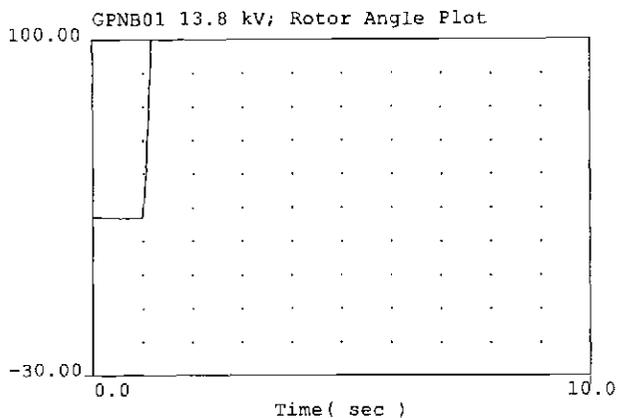
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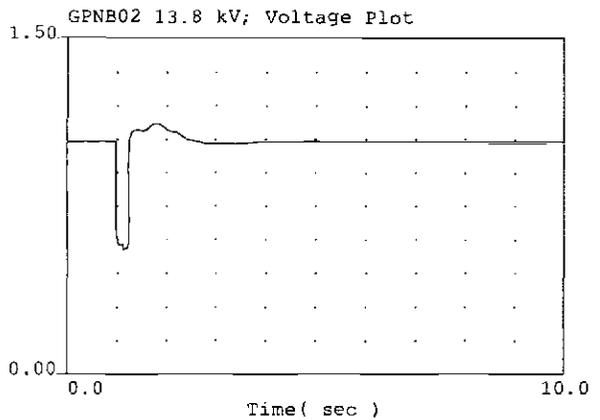
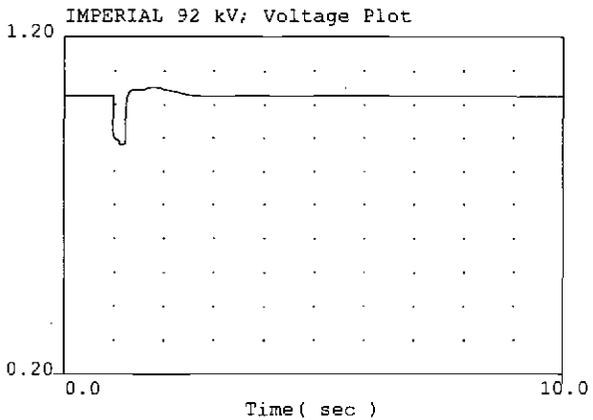
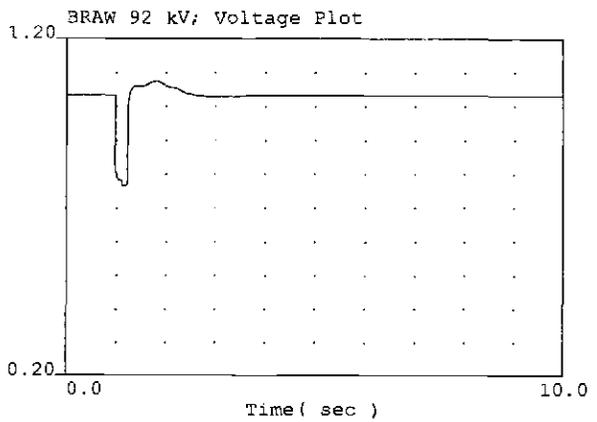
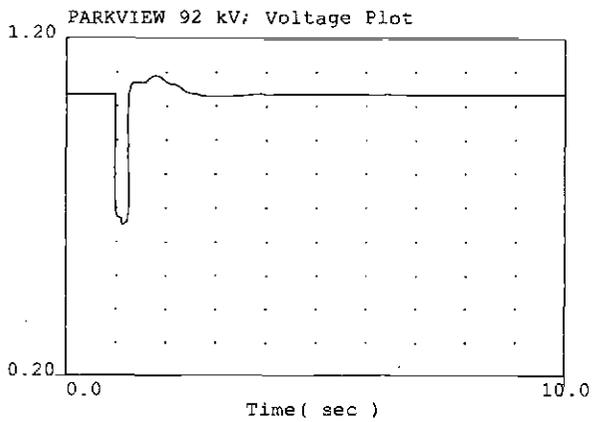
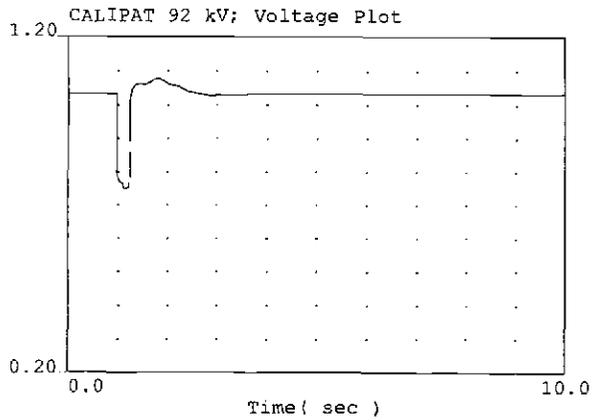
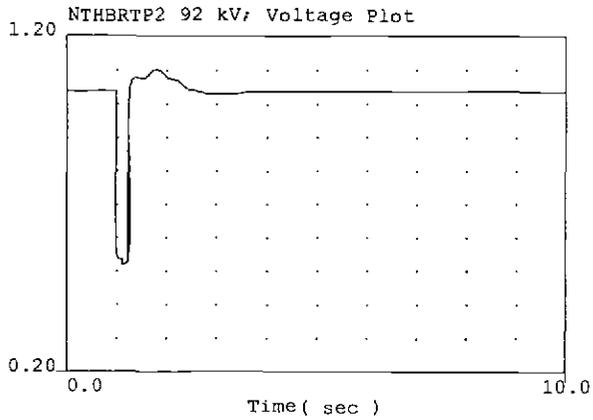
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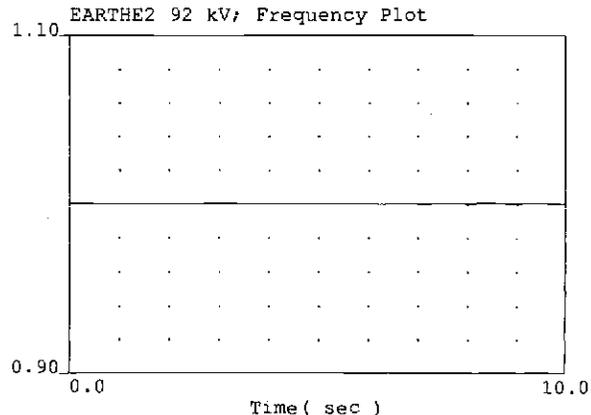
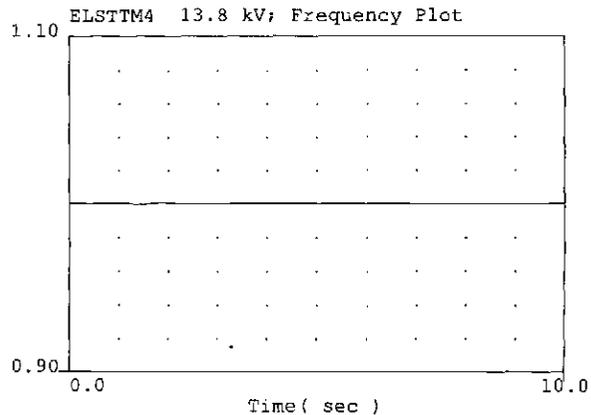
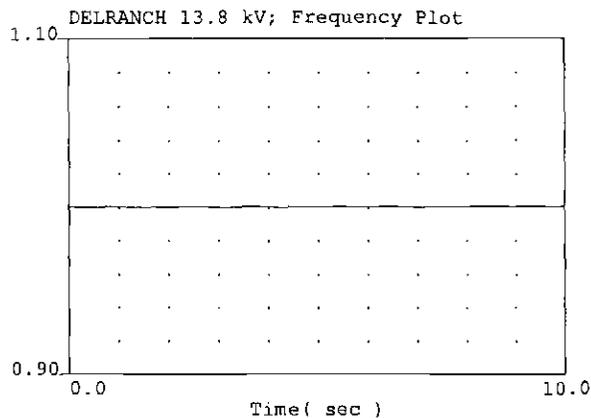
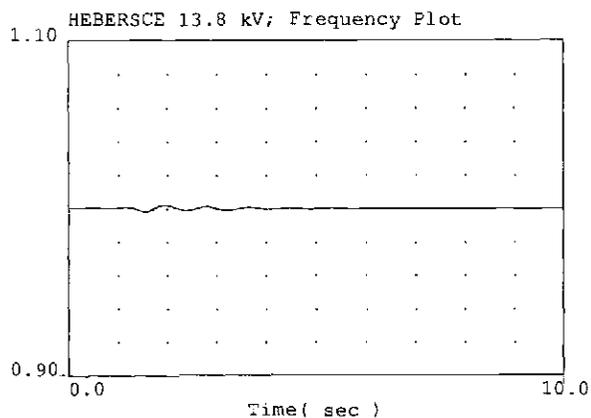
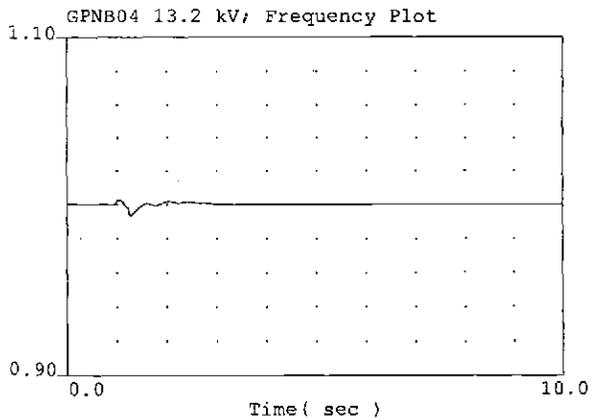
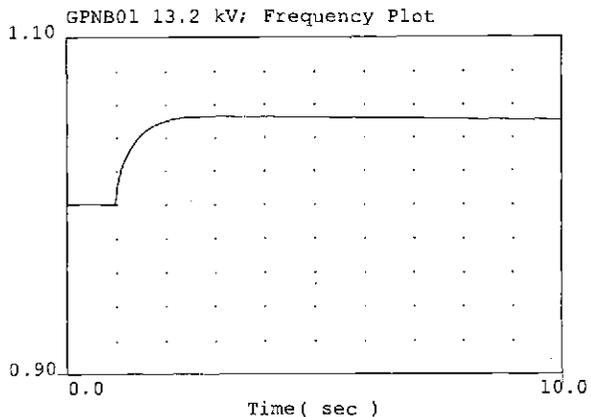
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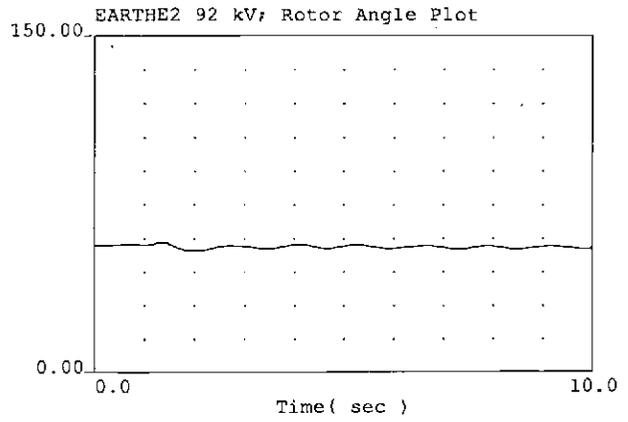
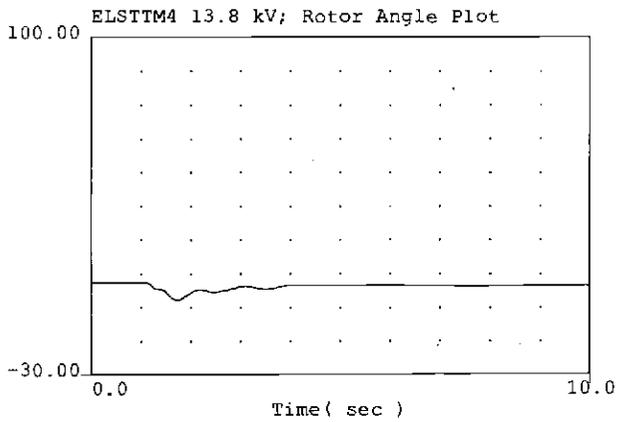
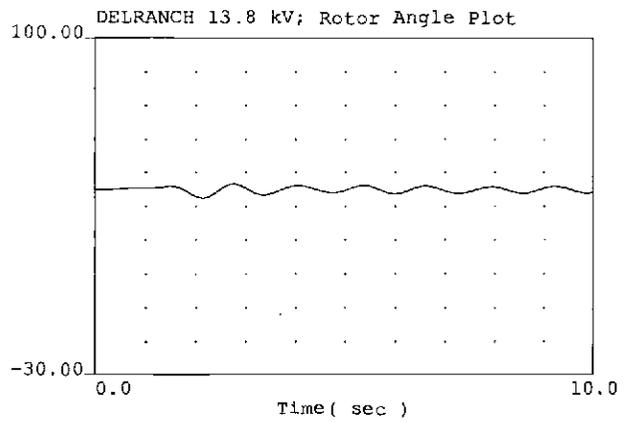
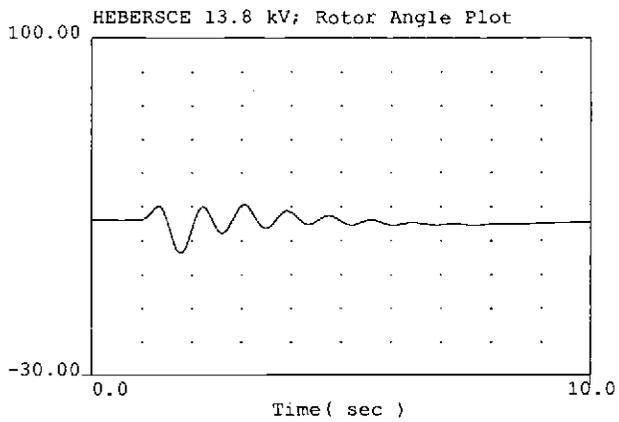
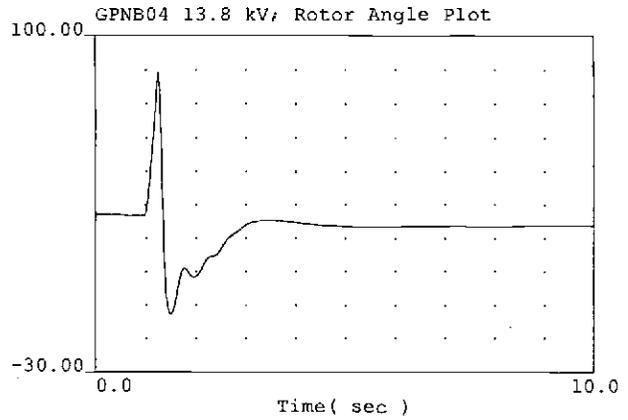
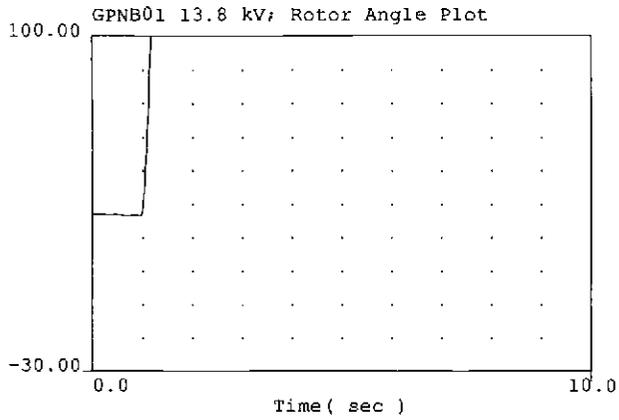
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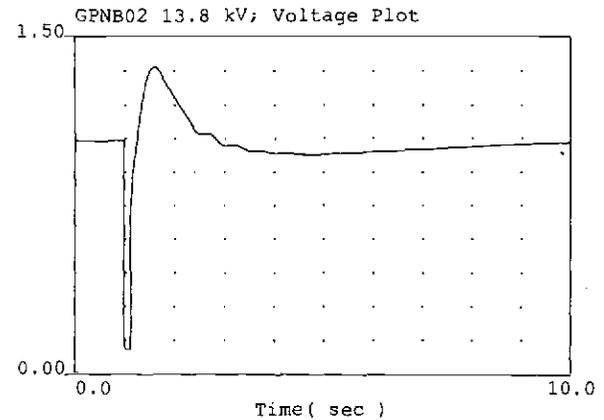
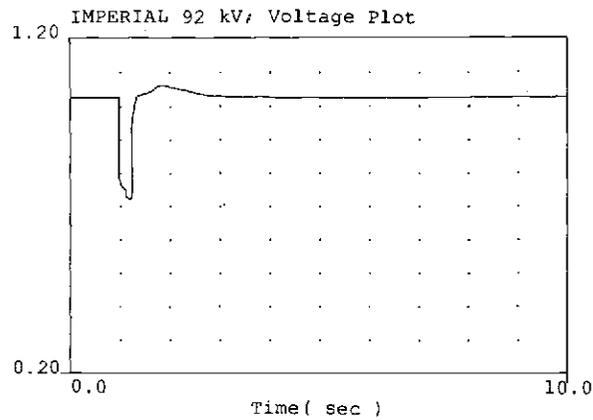
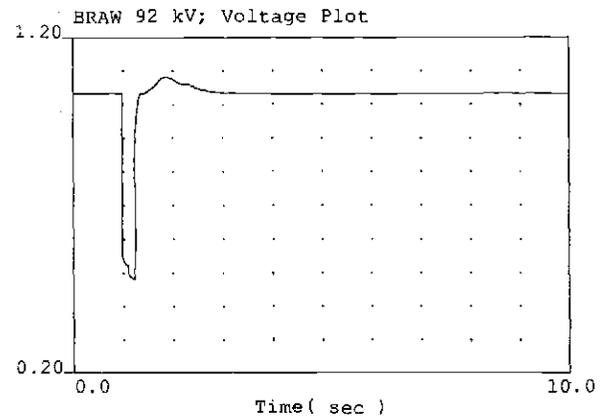
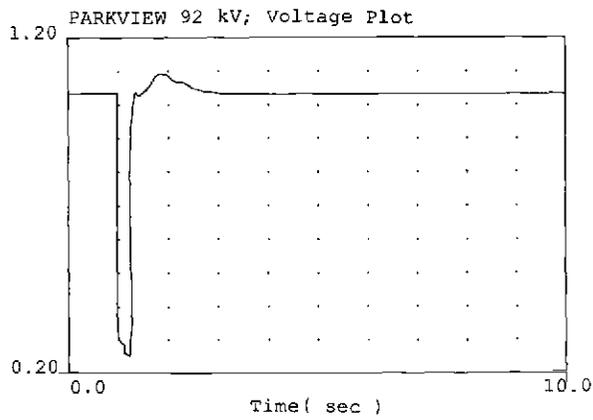
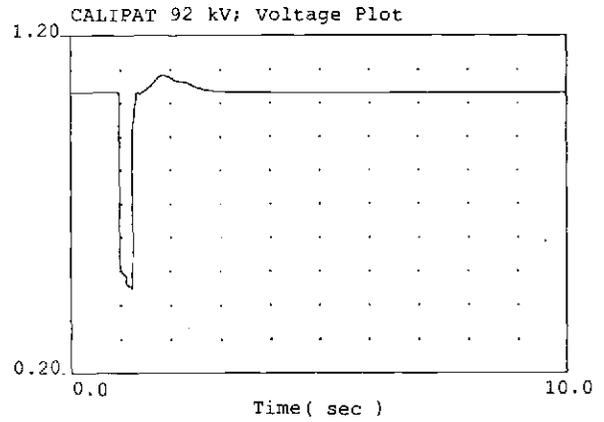
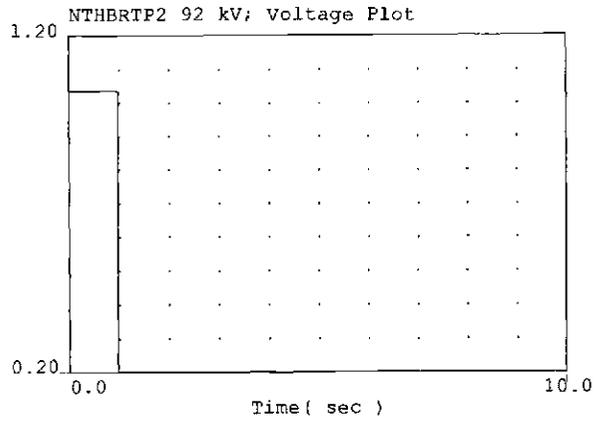
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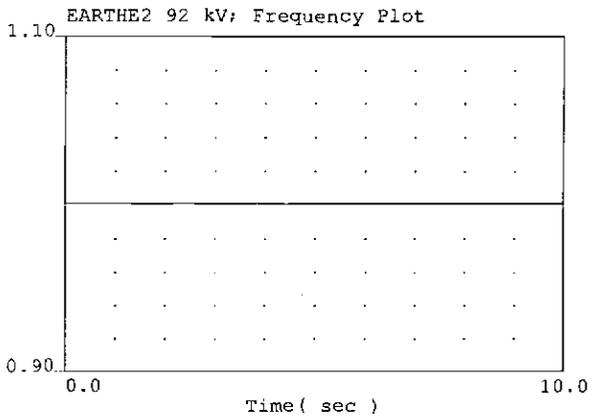
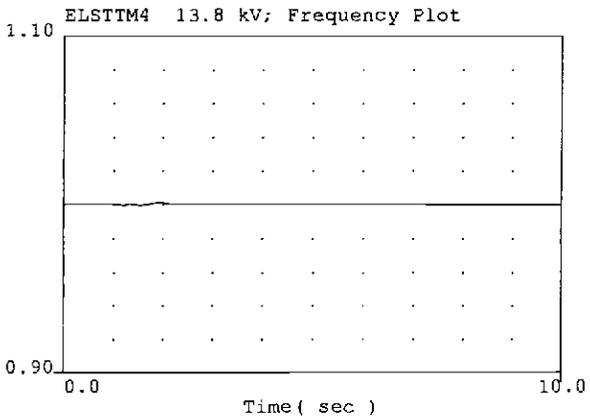
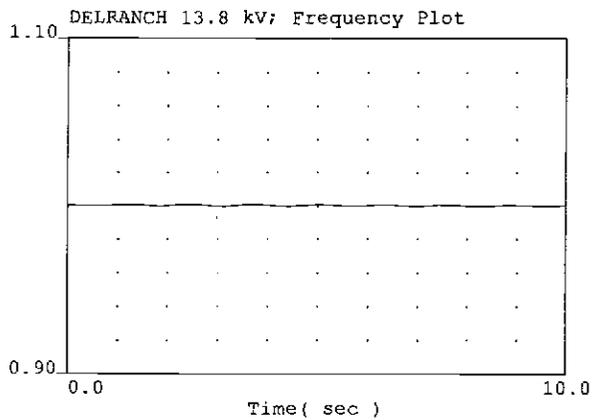
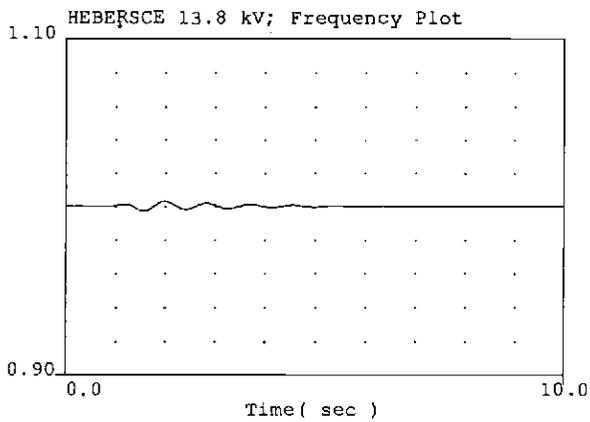
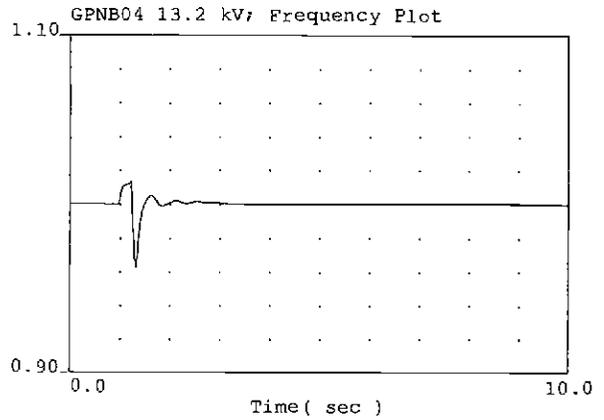
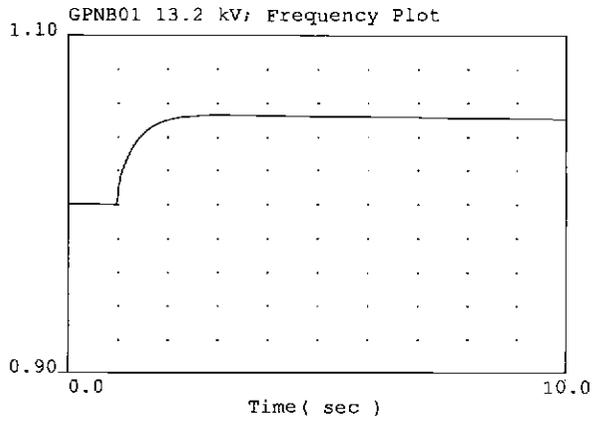
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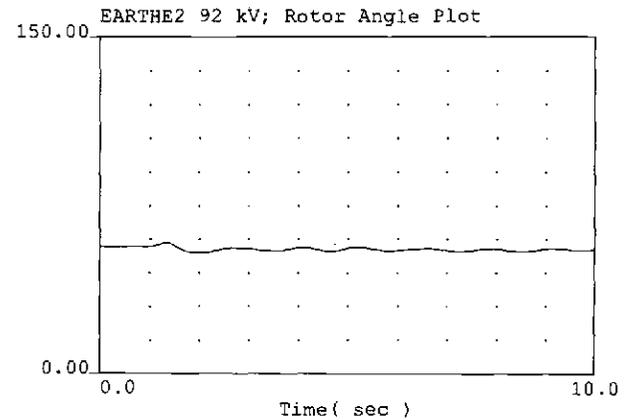
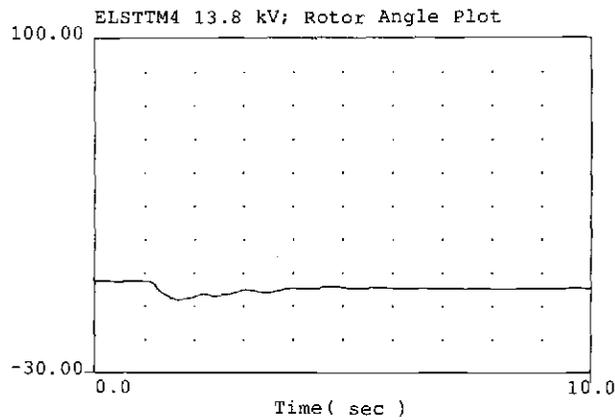
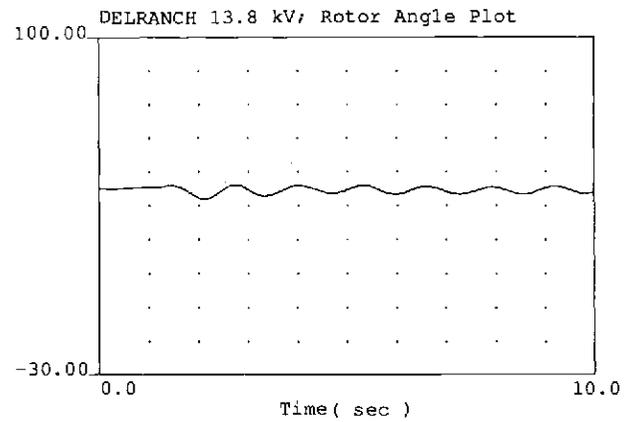
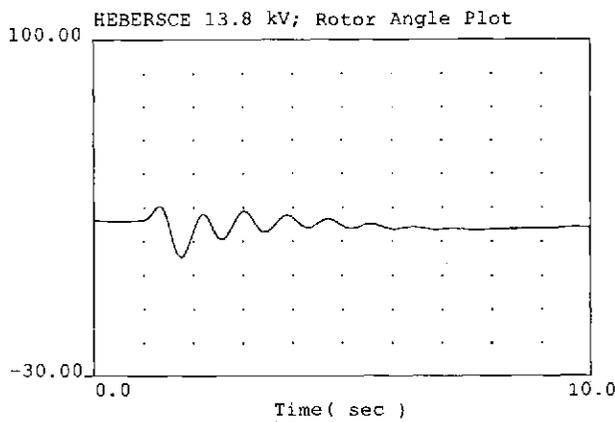
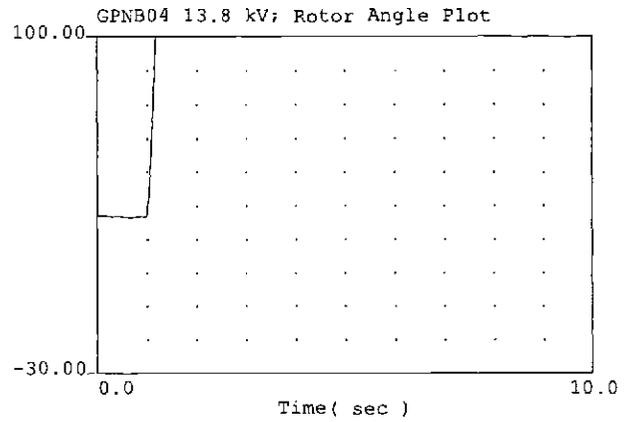
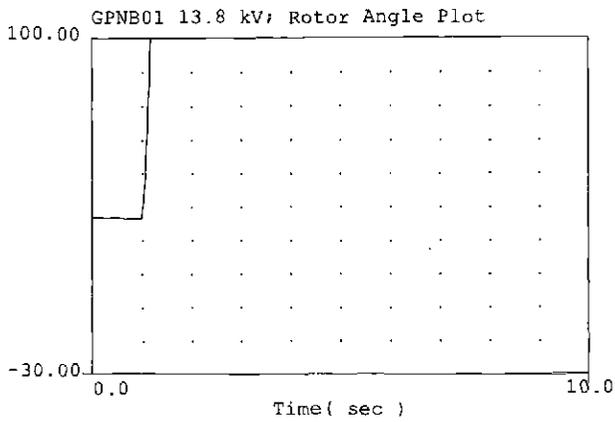
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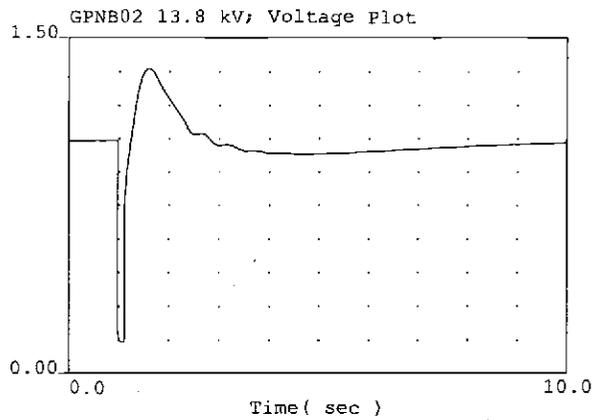
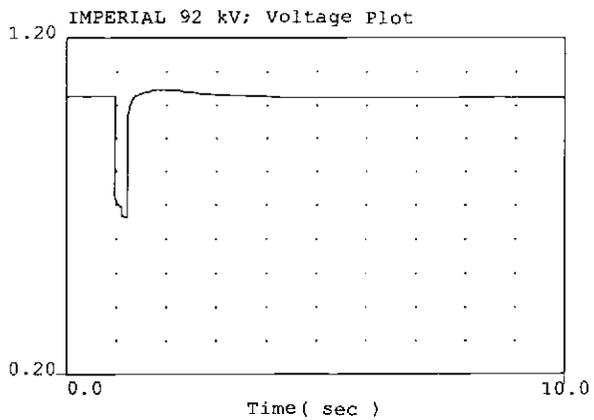
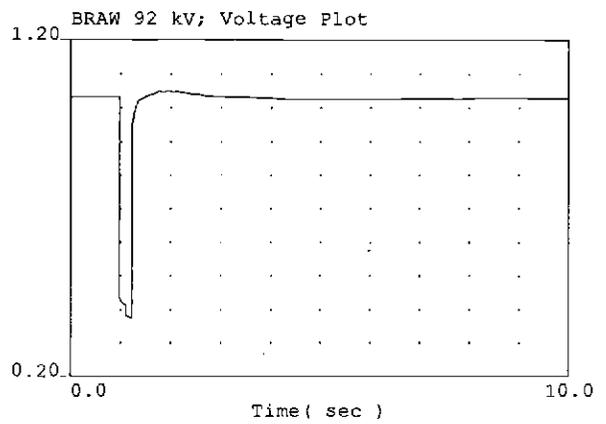
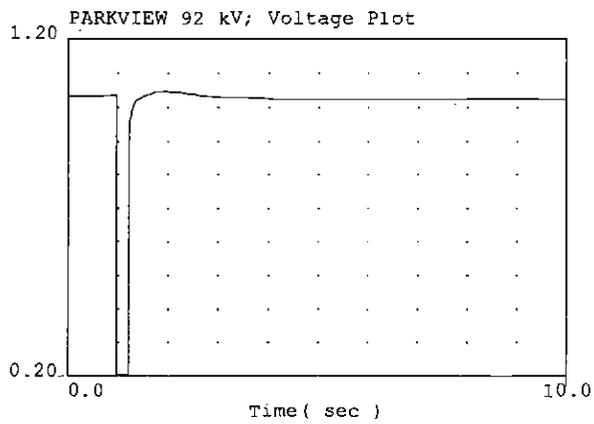
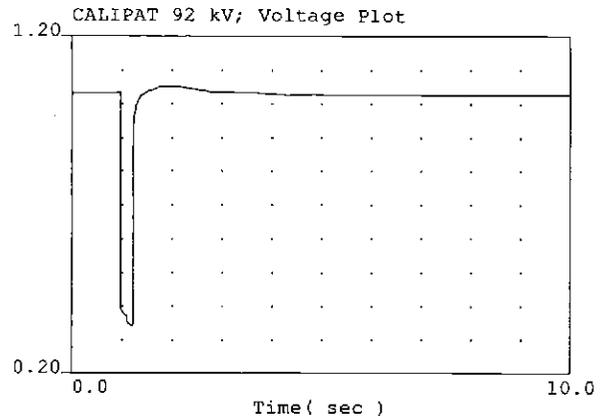
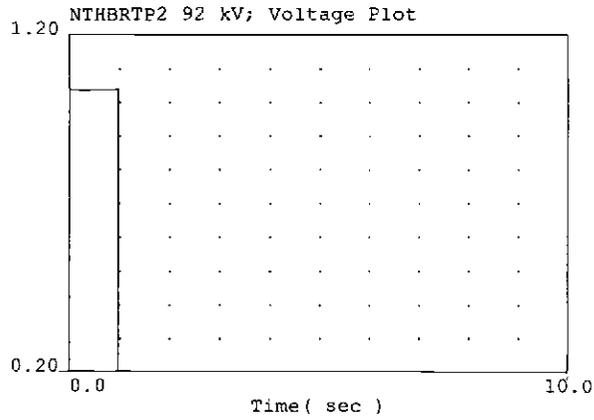
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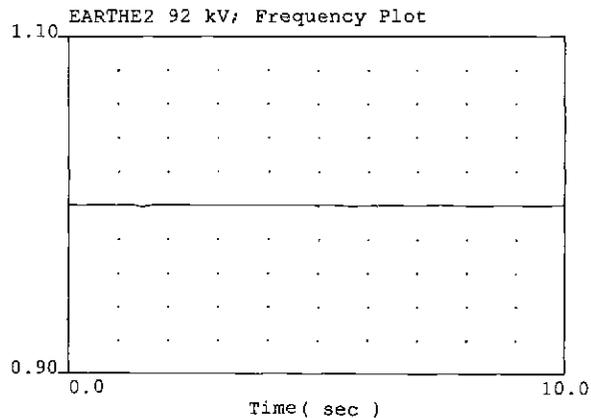
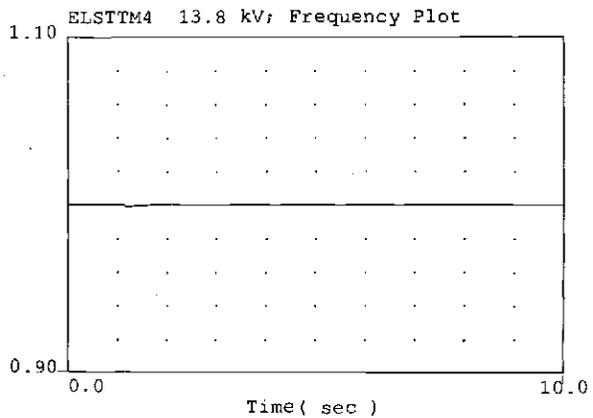
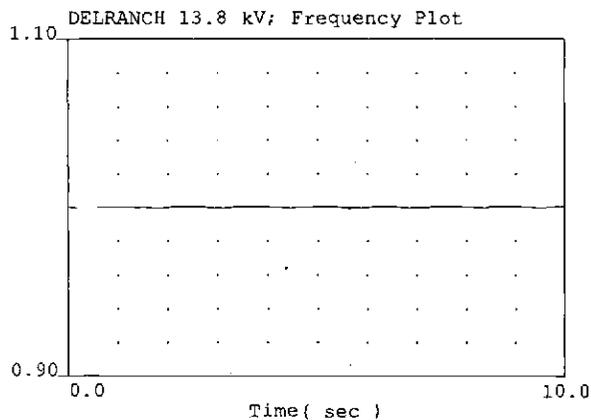
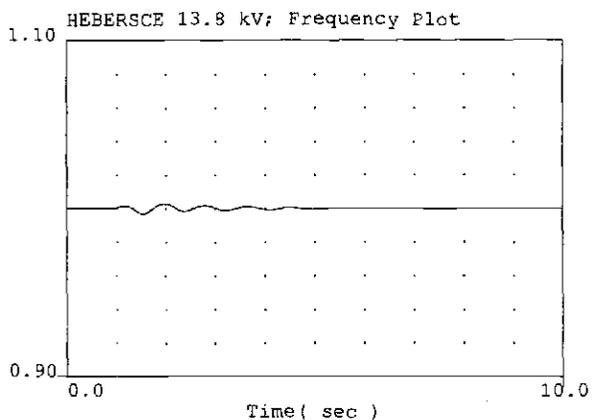
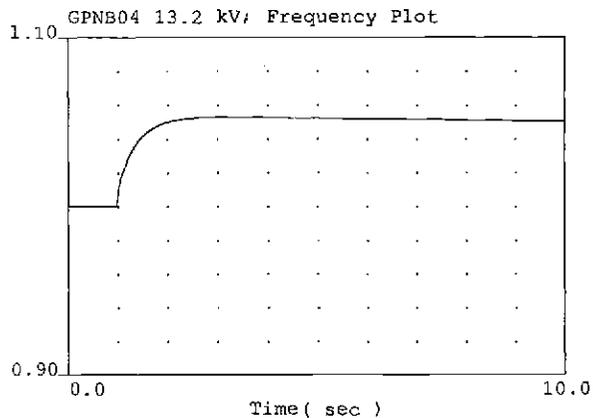
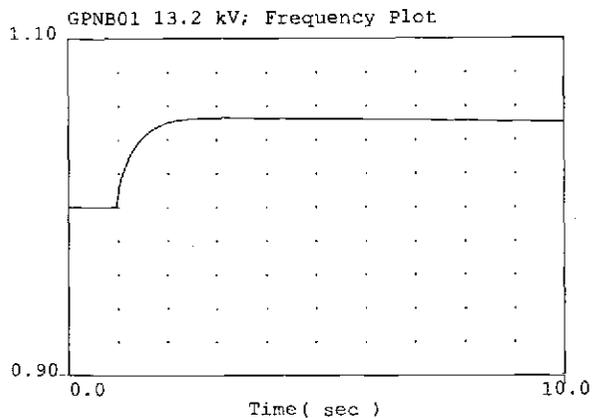
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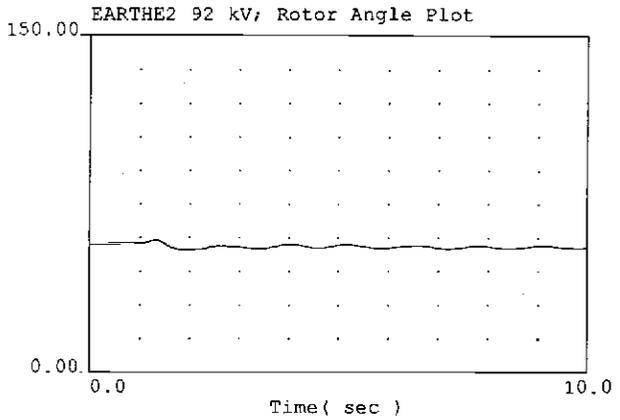
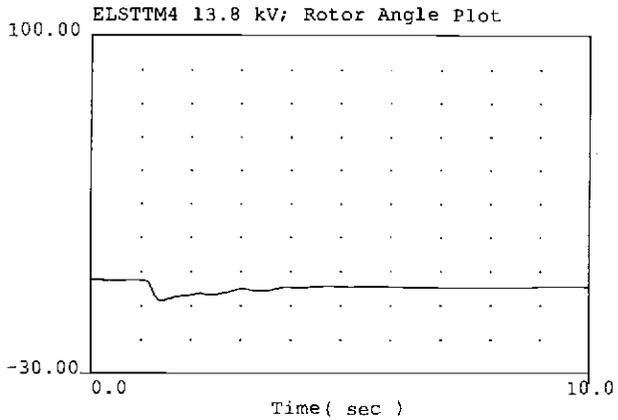
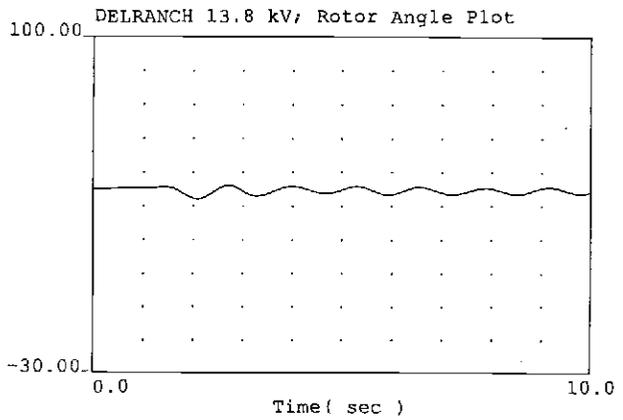
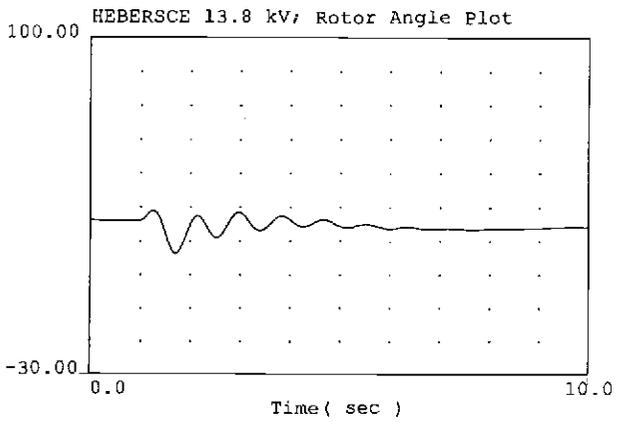
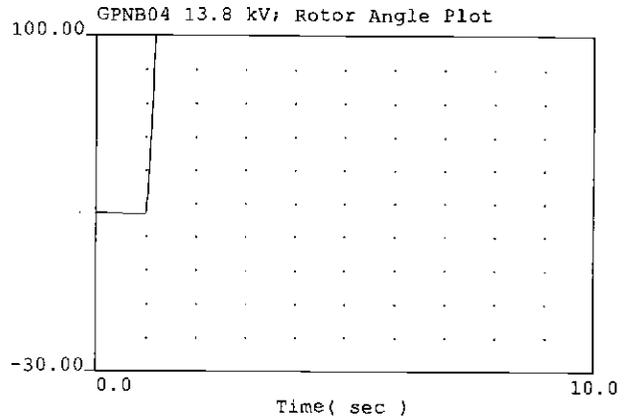
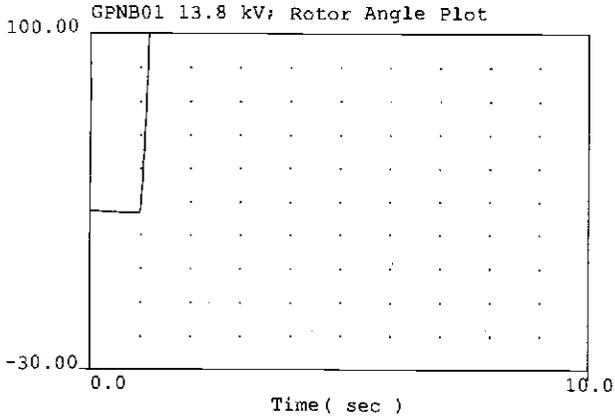
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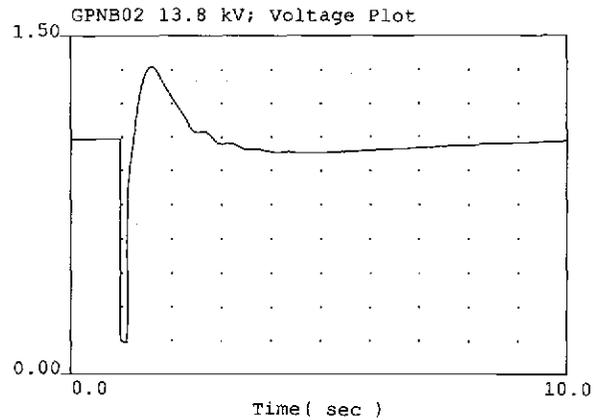
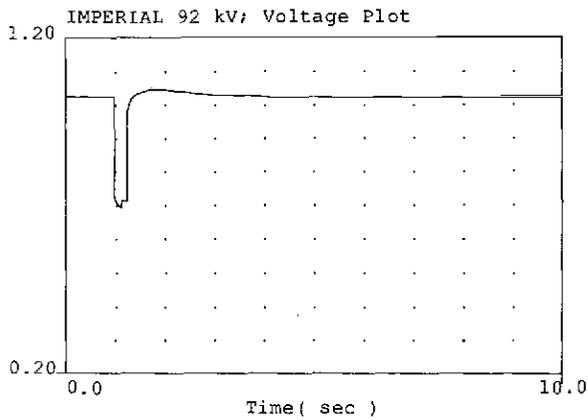
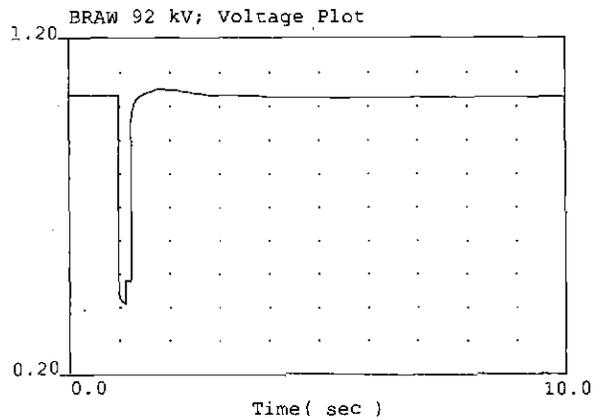
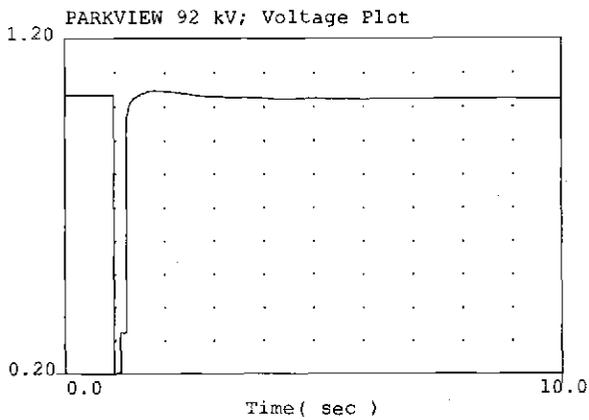
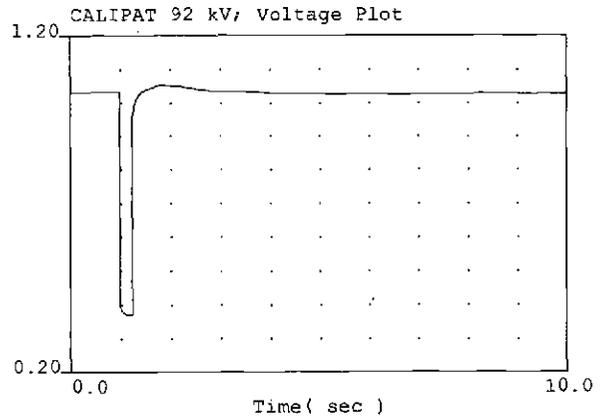
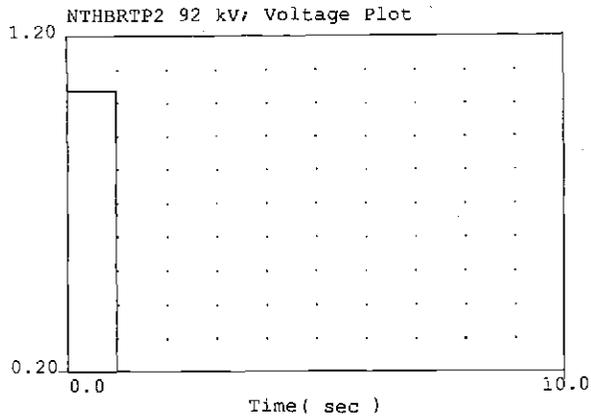
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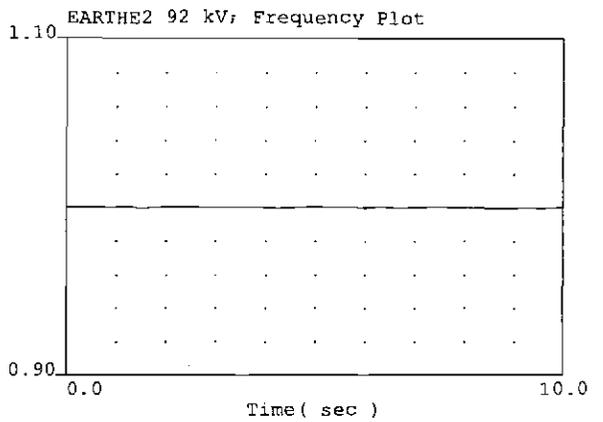
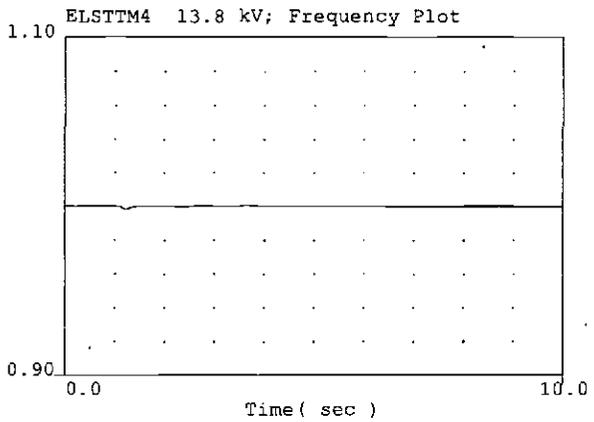
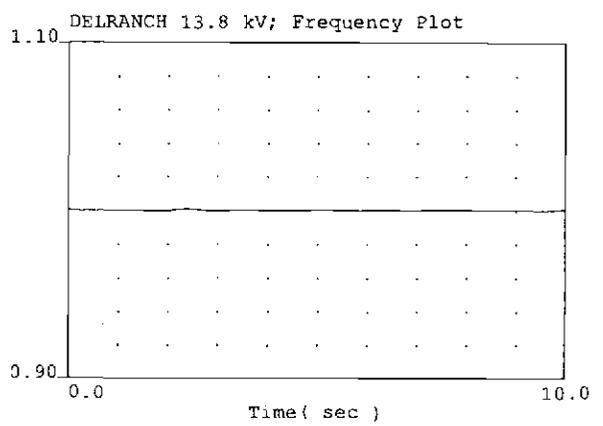
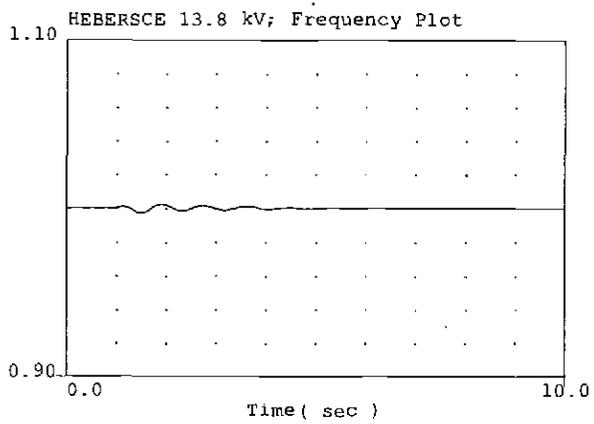
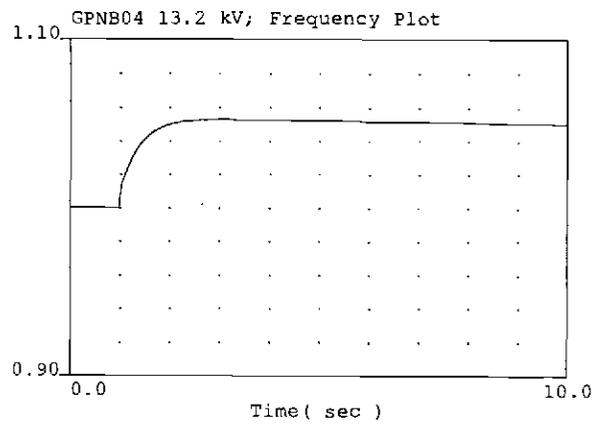
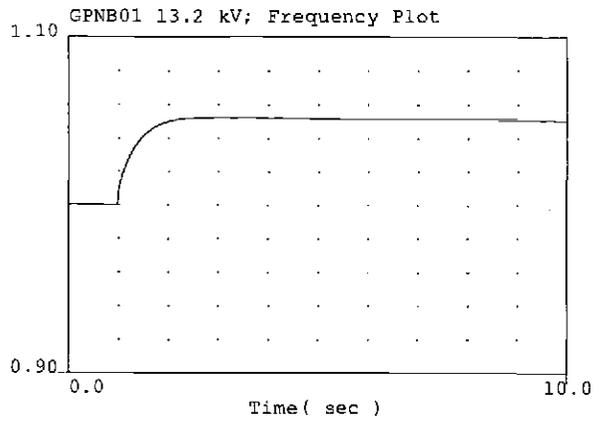
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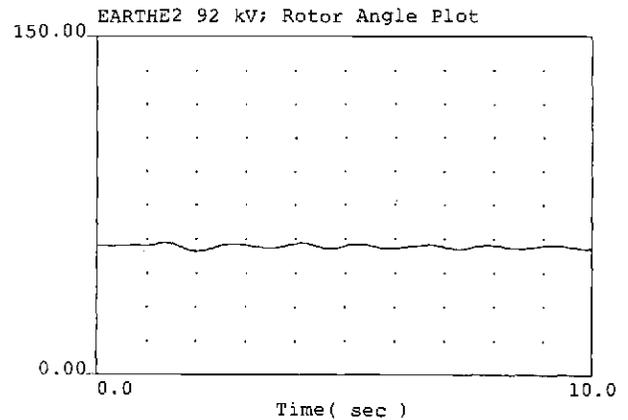
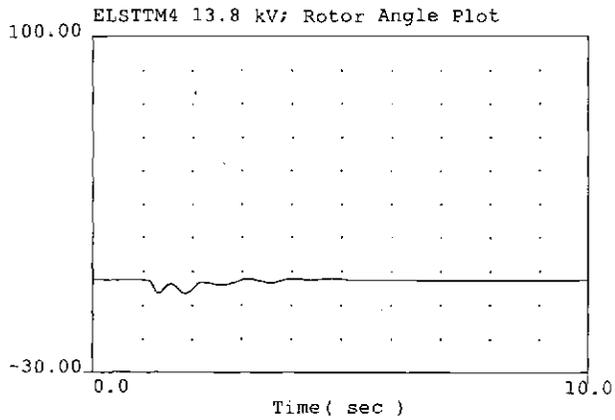
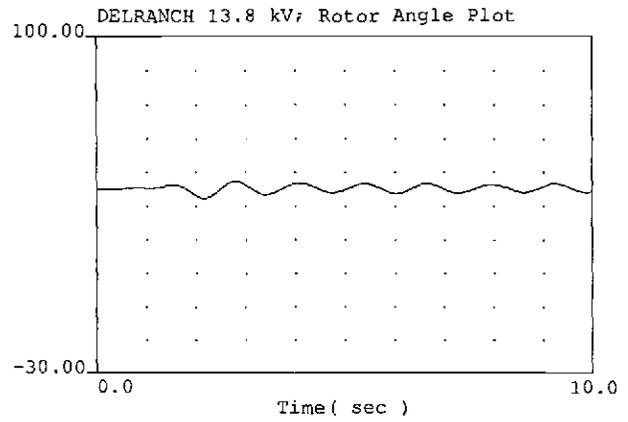
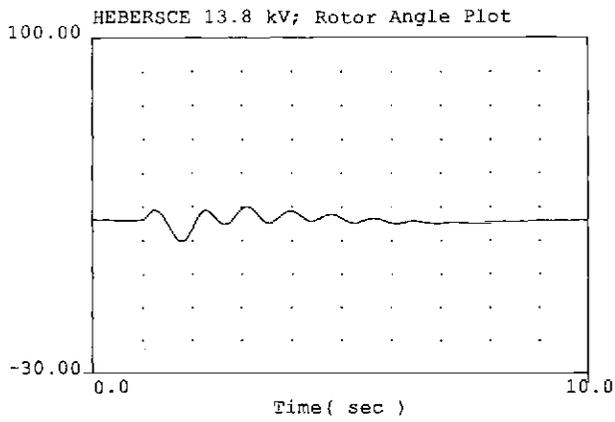
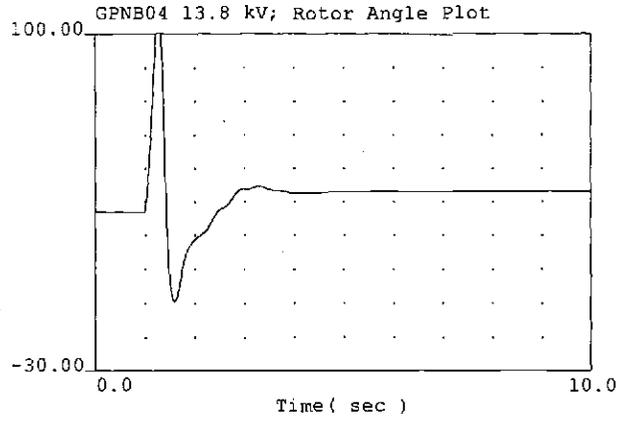
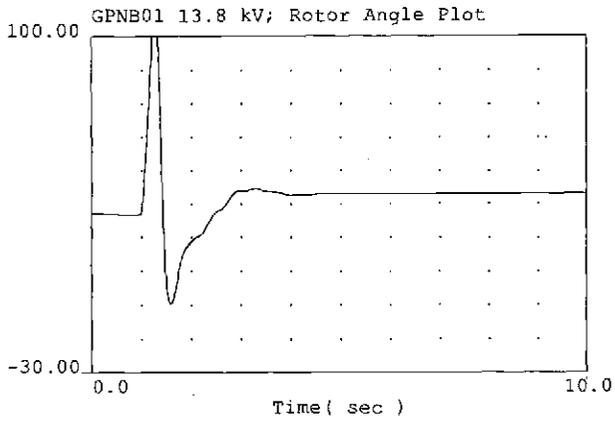
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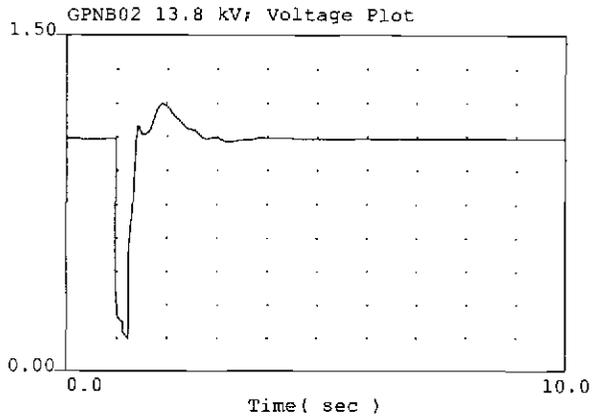
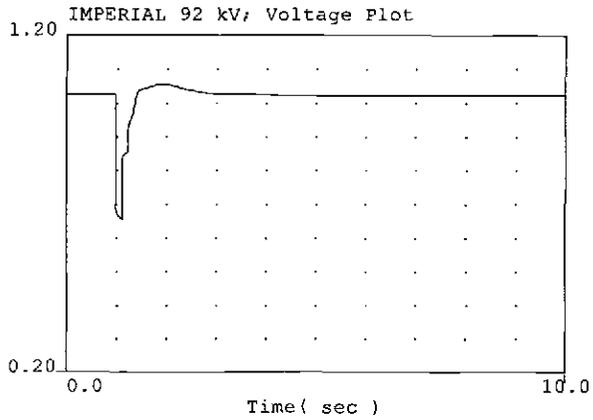
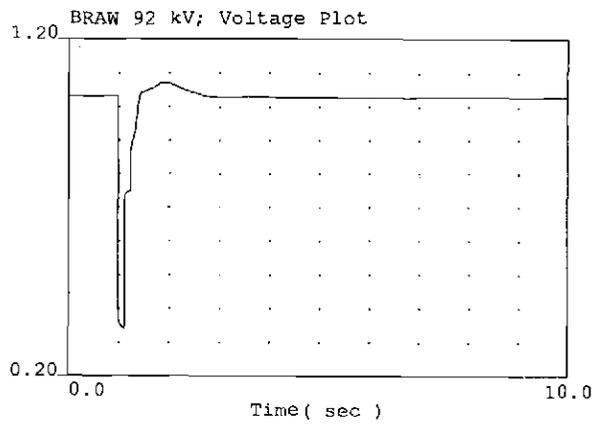
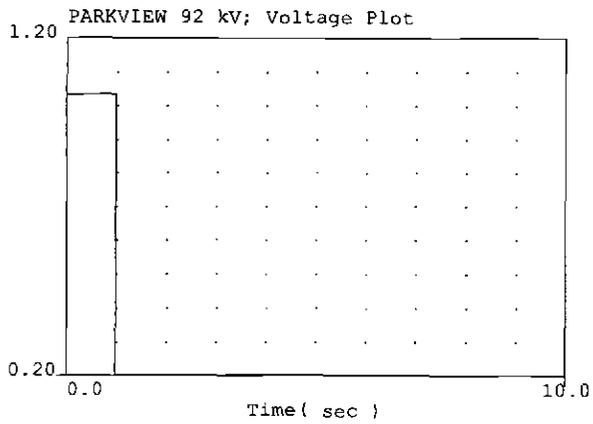
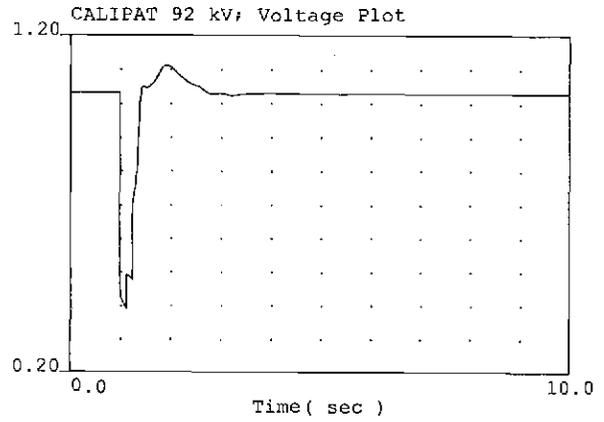
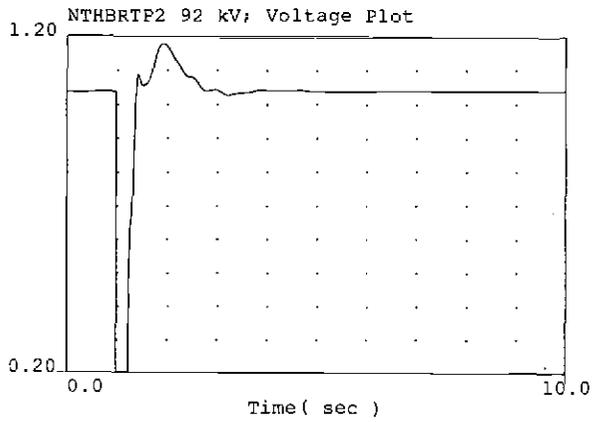
150 MW North Brawley Geothermal Project



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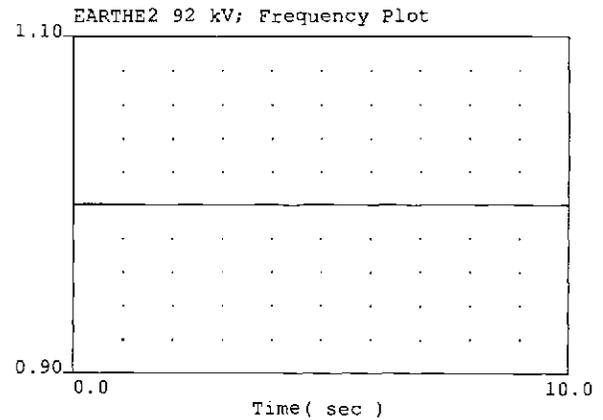
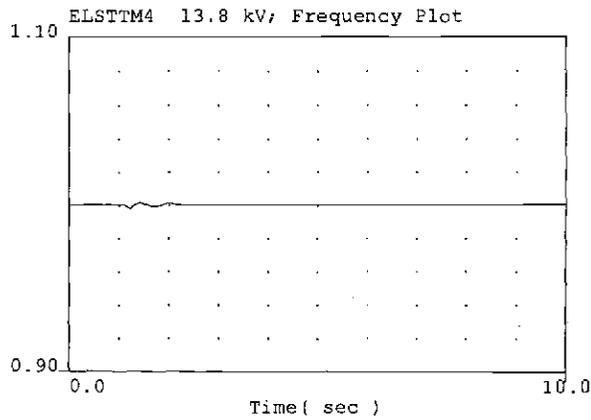
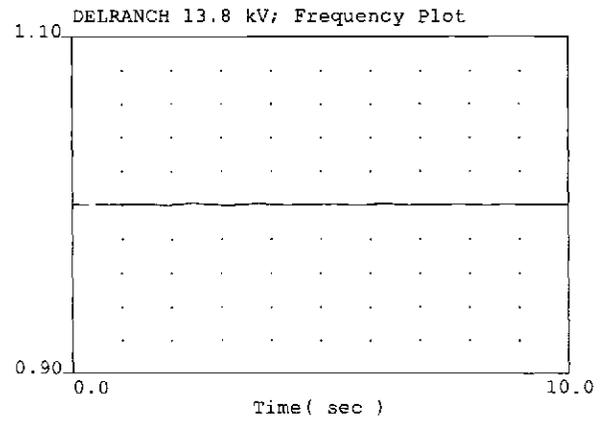
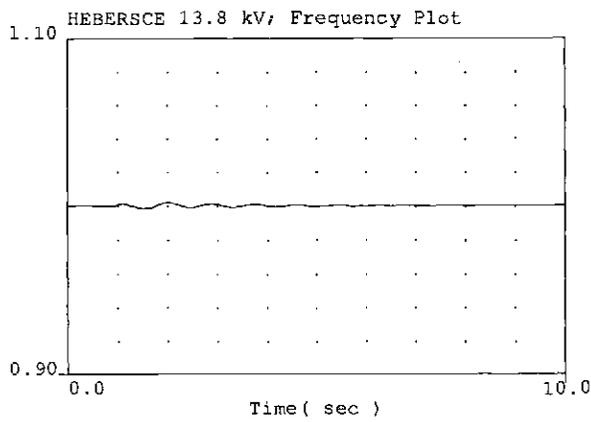
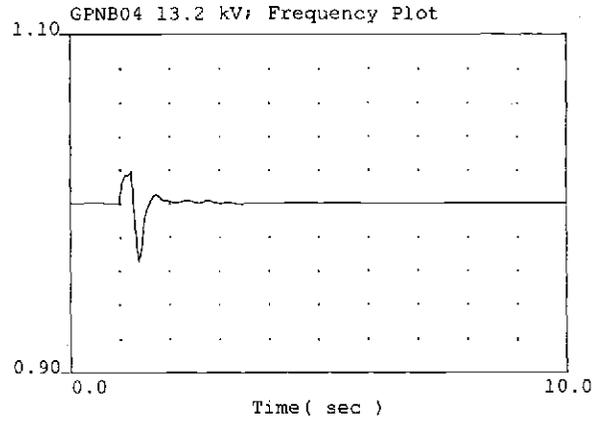
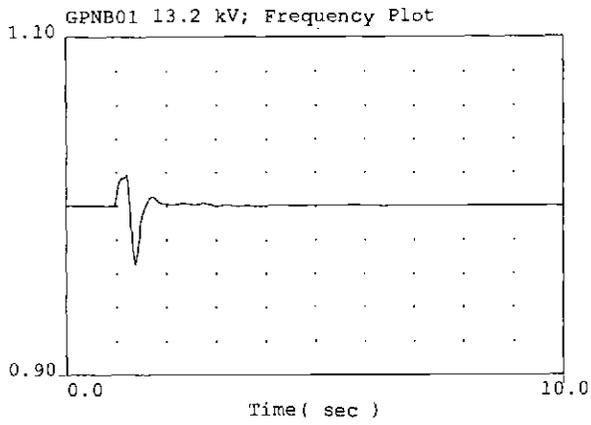
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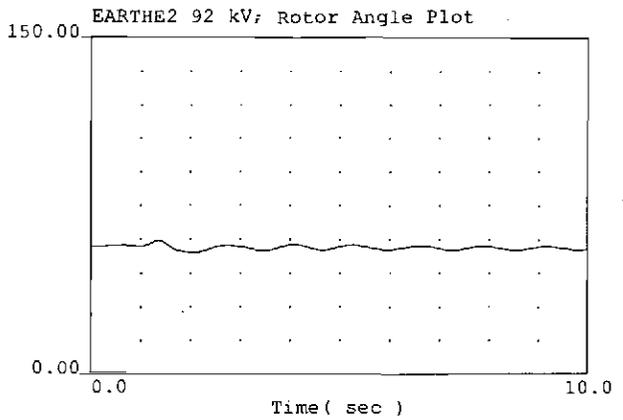
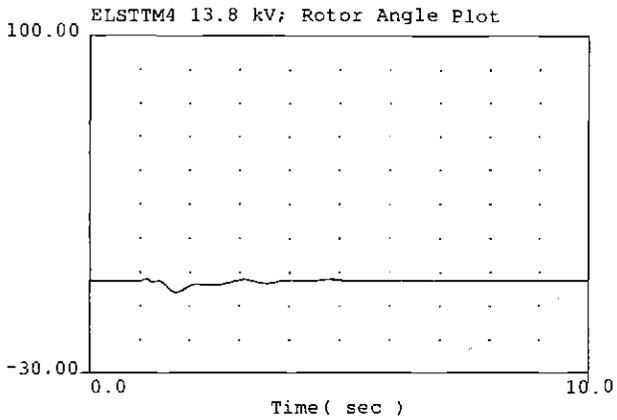
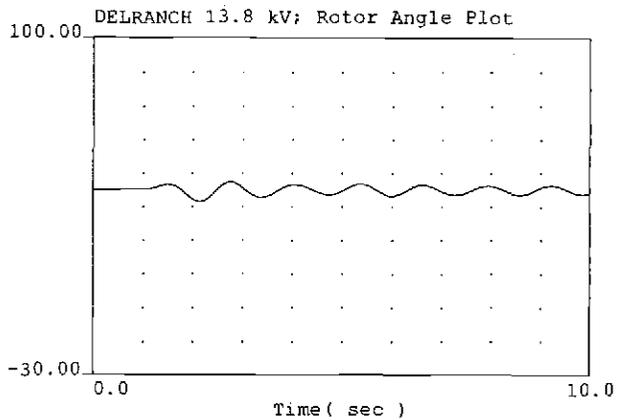
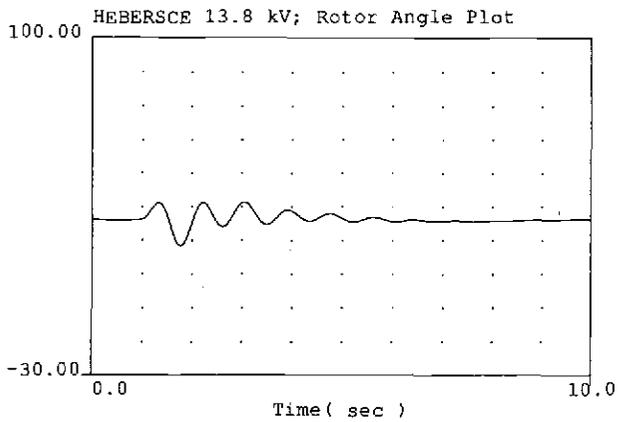
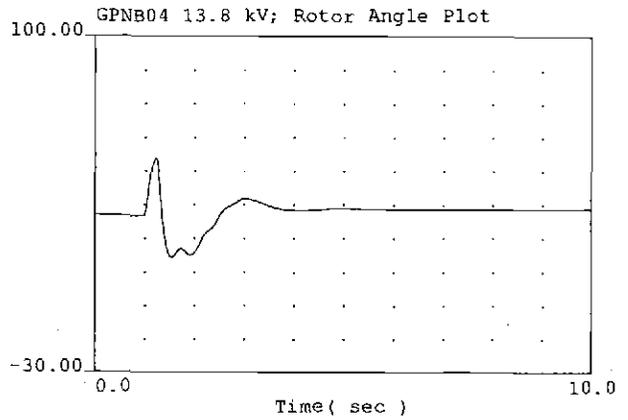
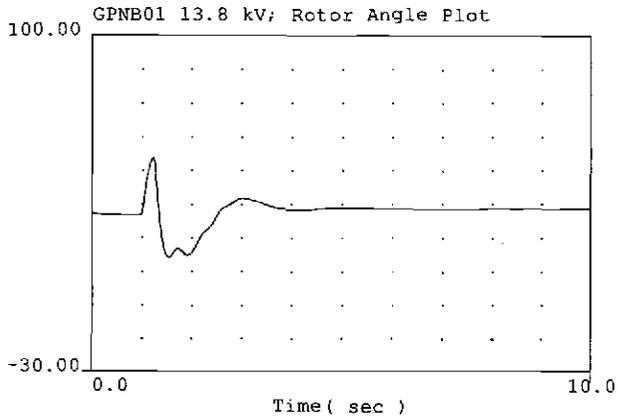
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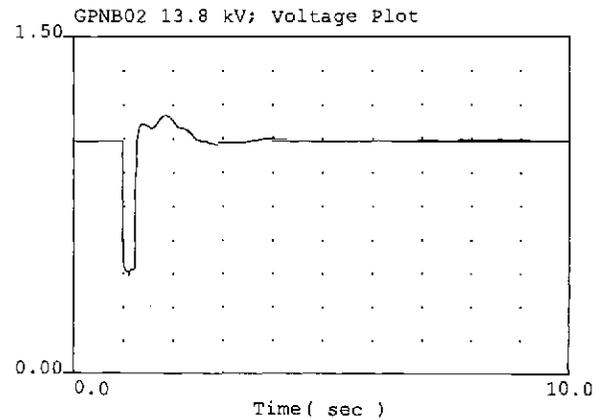
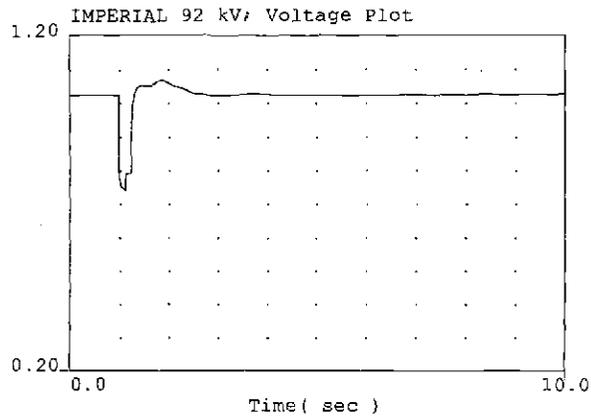
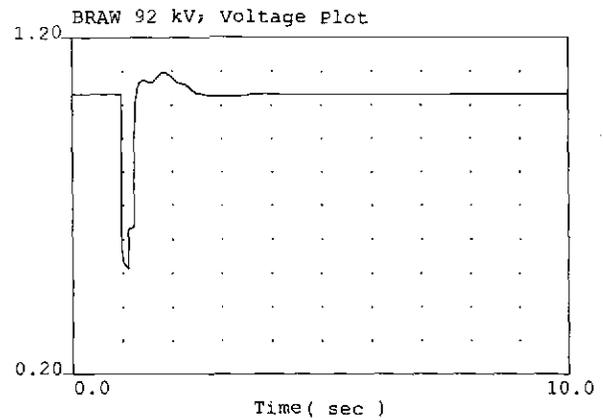
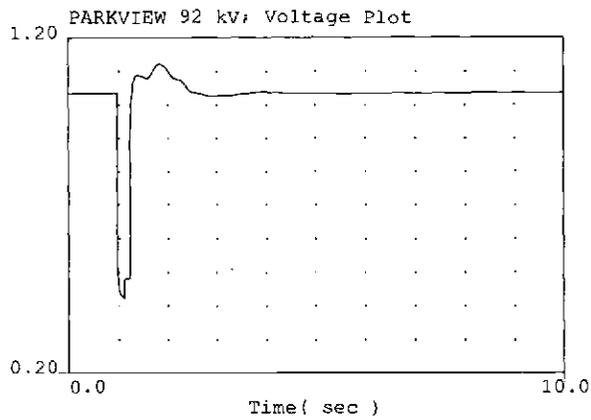
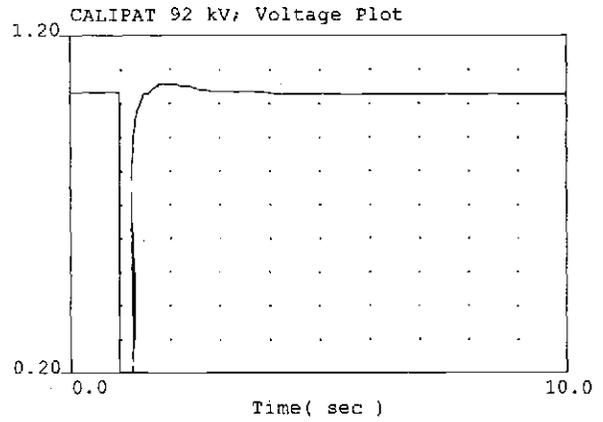
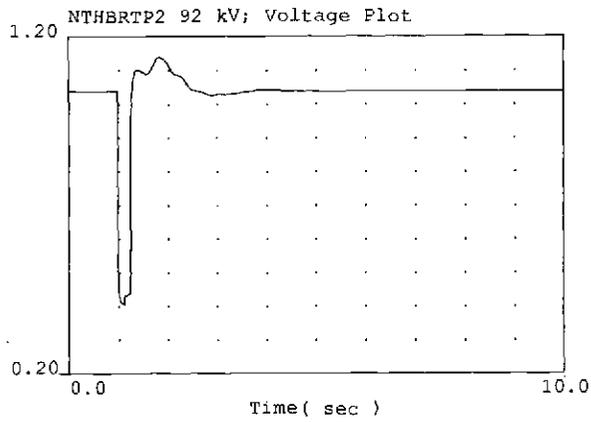
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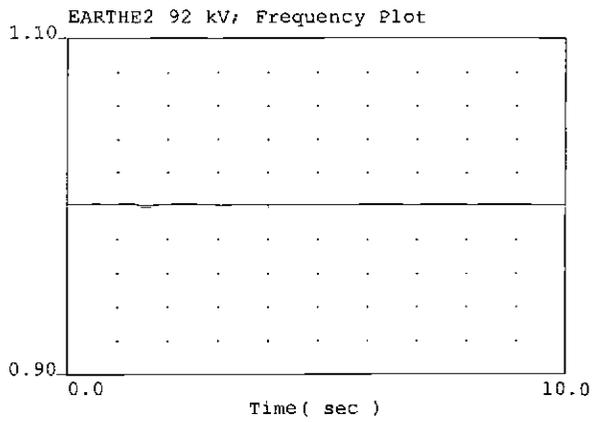
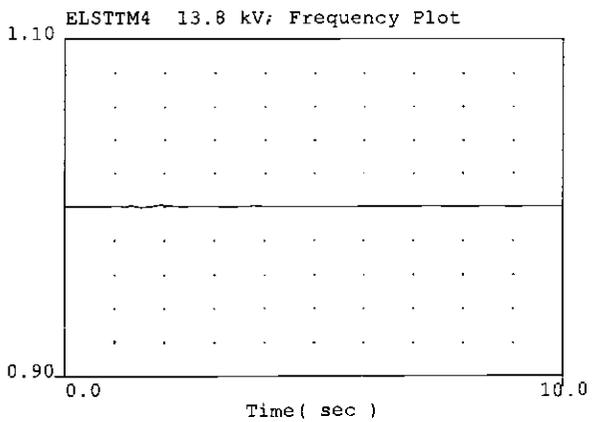
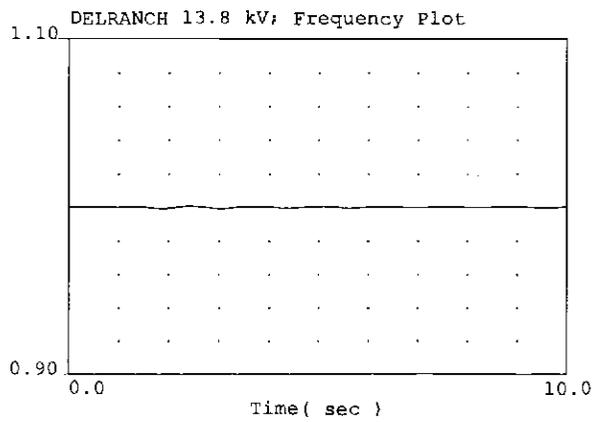
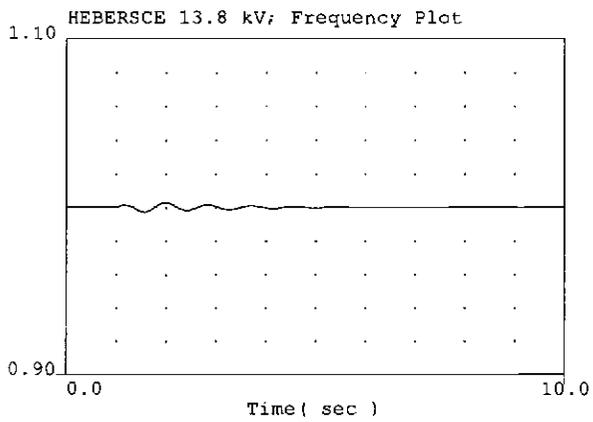
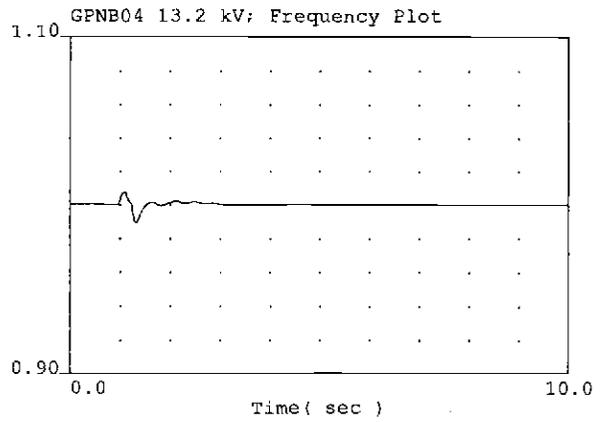
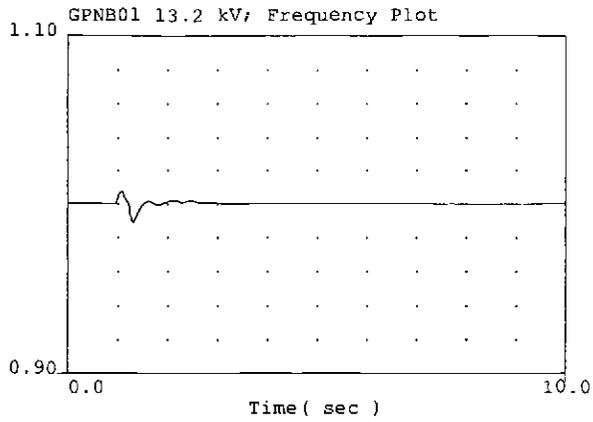
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**North Brawley
System Impact Study**



**Appendix E
Off-Peak Light Winter Transient Stability Plots
Post Project**

APPENDIX E

Stability Plots for Light Winter Case: LW-W

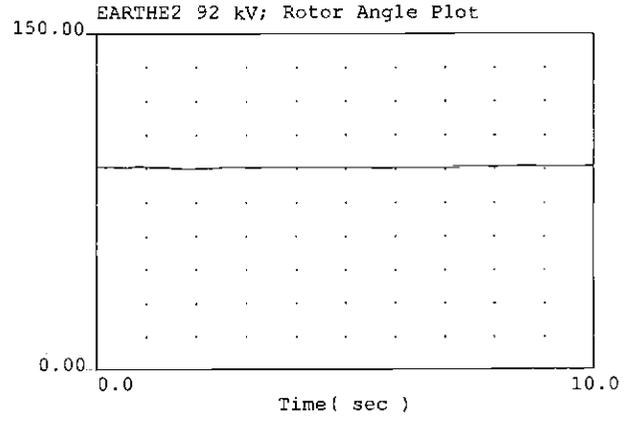
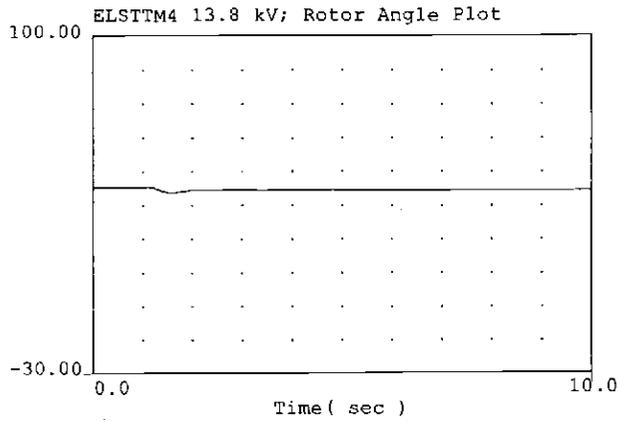
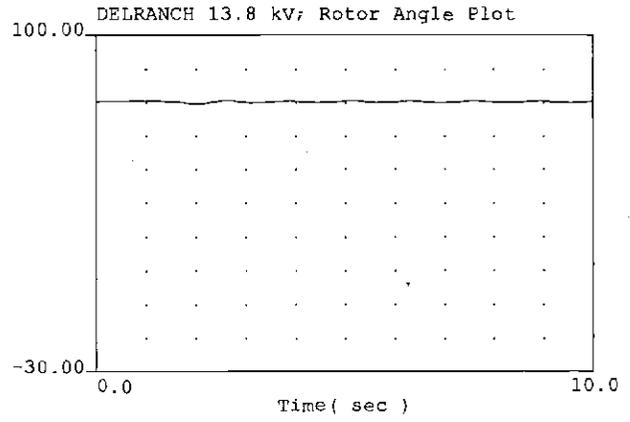
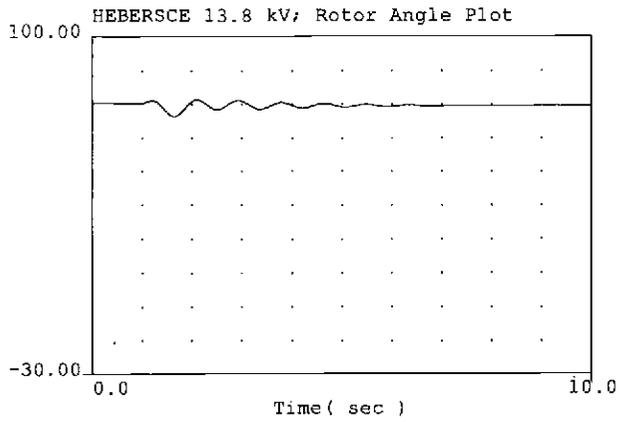
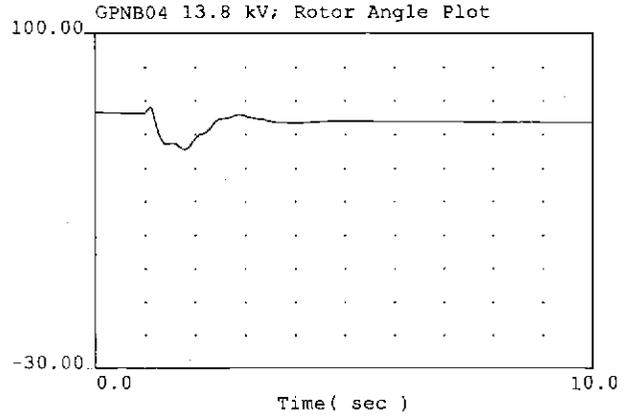
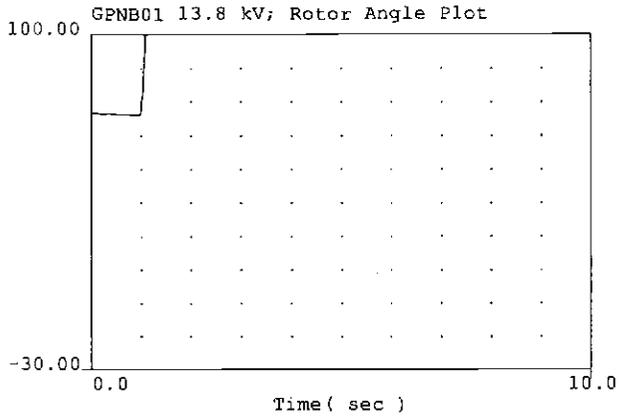
Each case contains the following:

- **Rotor angle plot**
- **Bus voltage plot**
- **Frequency plot**

Summary of Light Winter Cases

Item#	Case Description
	<u>Normal Fault Clearing Cases</u>
A1	3-phase fault at bus 8963, fault cleared by tripping generators 1 to 3.
A2	3-phase fault at bus 8967, fault cleared by tripping generators 1 to 6.
A3	3-phase fault at bus 8962, fault cleared by tripping generators 1 to 12.
A4	3-phase fault at bus 8970, fault cleared by tripping generators 1 to 12.
A5	3-phase fault at bus 8740, fault cleared by tripping line between buses
A6	8740 to 8970. 3-phase fault at bus 8697, fault cleared by tripping line between buses 8697 to 8970.
	<u>Back up Fault Clearing Cases</u>
B1	3-phase fault at bus 8963, 8cy fault cleared by tripping generators 1 to 3. Stuck breaker#13.
B2	3-phase fault at bus 8967, 8 cy fault cleared by tripping generators 1 to 6. Stuck breaker#21.
B3	3-phase fault at bus 8962, 8 cy fault cleared by tripping generators 1 to 12. Stuck breaker#25.
B4	3-phase fault at bus 8970, 8 cy fault cleared by tripping generators 1 to 12. Stuck breaker#27. Trip line between buses (8970 to 8697) in 15 cycles.
B5	3-phase fault at bus 8740, 8 cy fault cleared by tripping line between buses 8740 to 8980. Trip line between buses (8740 to 8970) in 15 cycles.
B6	3-phase fault at bus 8697, fault cleared by tripping line between buses 8697 to 8936. Trip line between buses (8740 to 8697) in 15 cycles.

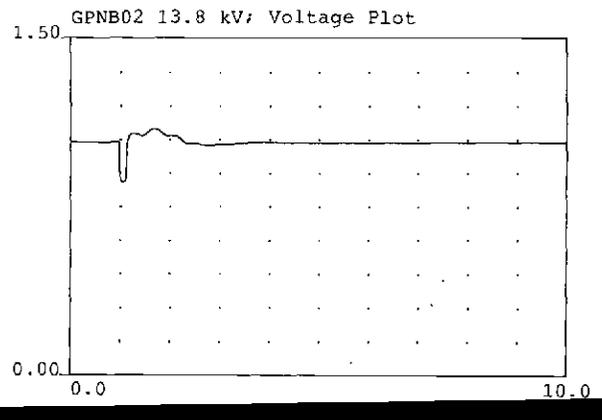
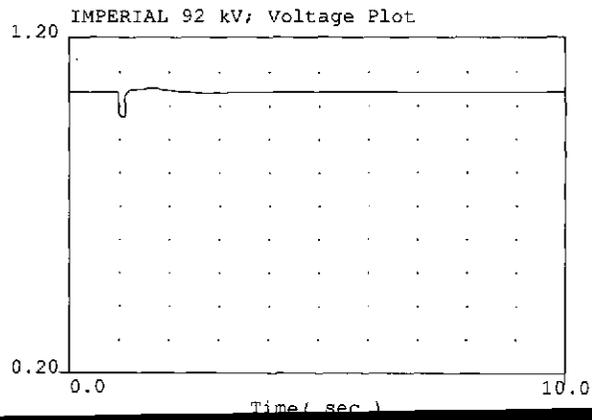
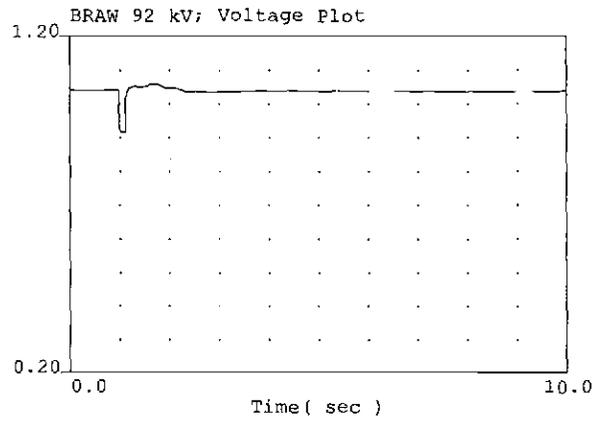
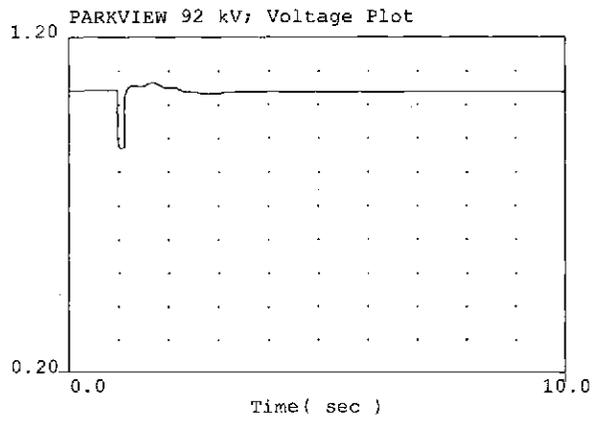
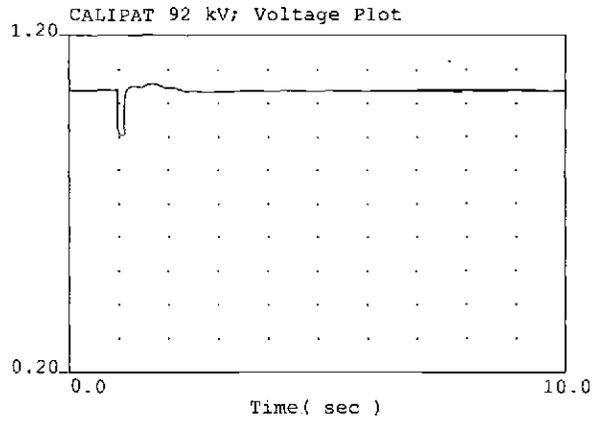
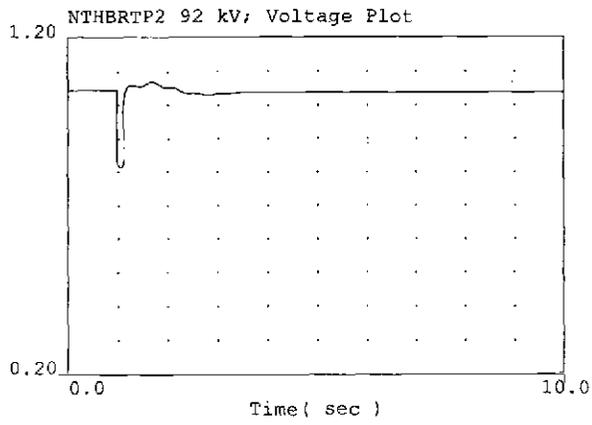
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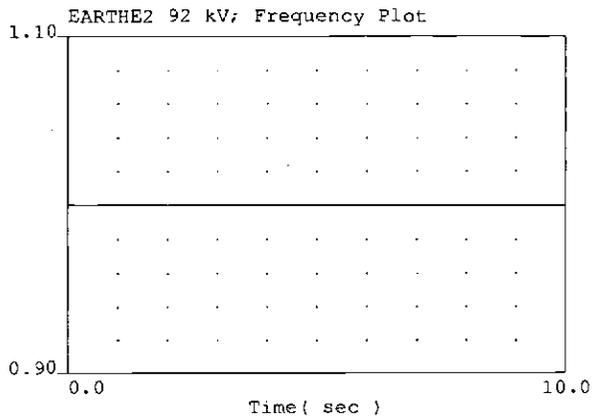
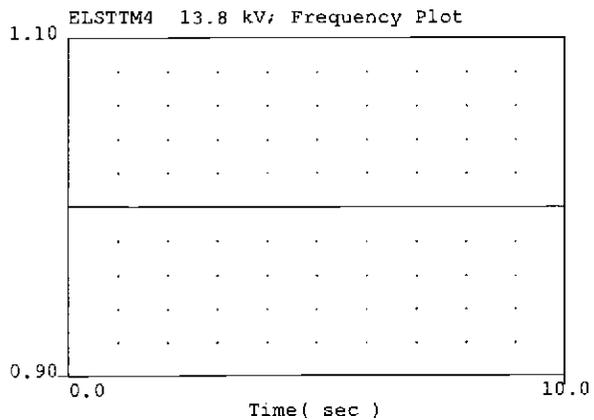
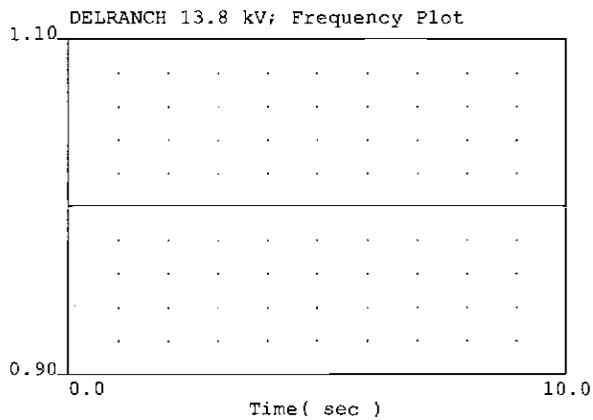
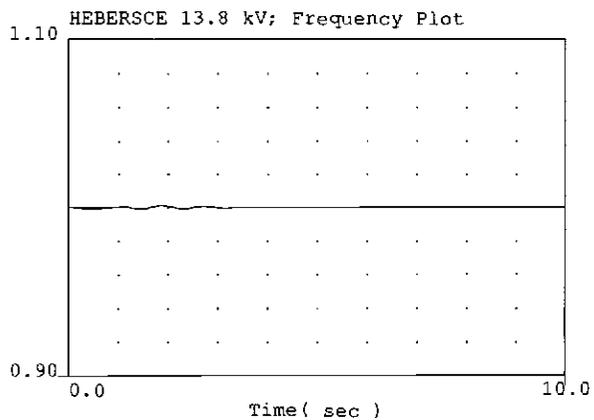
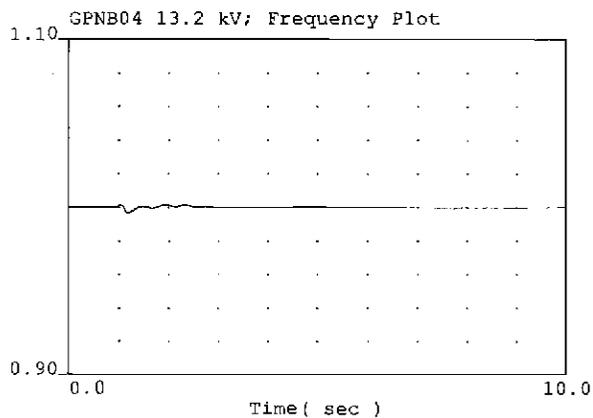
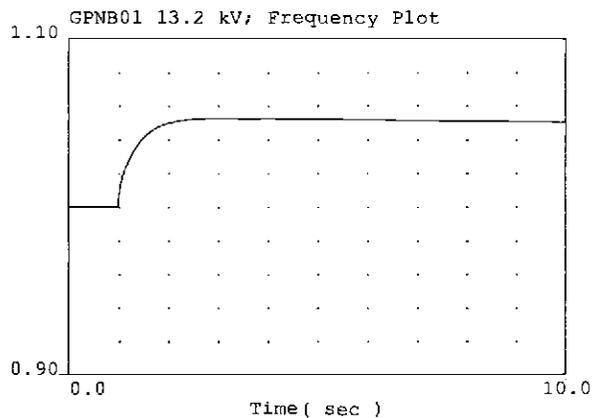
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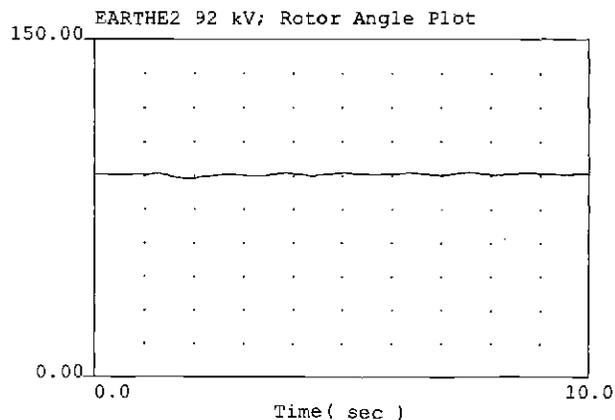
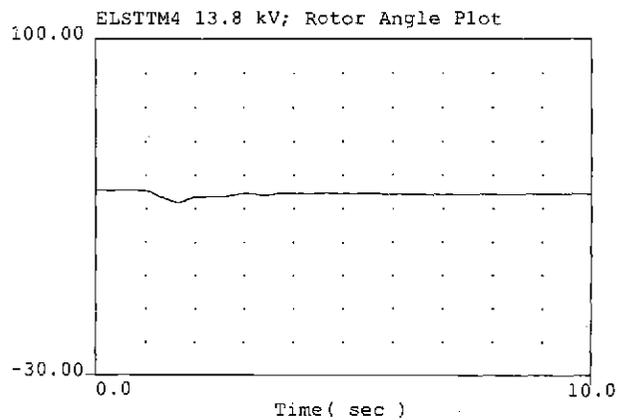
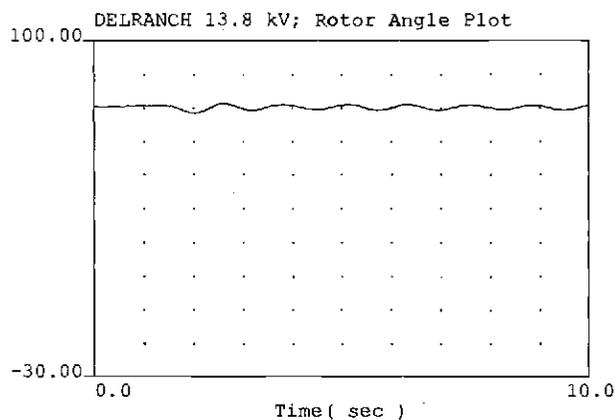
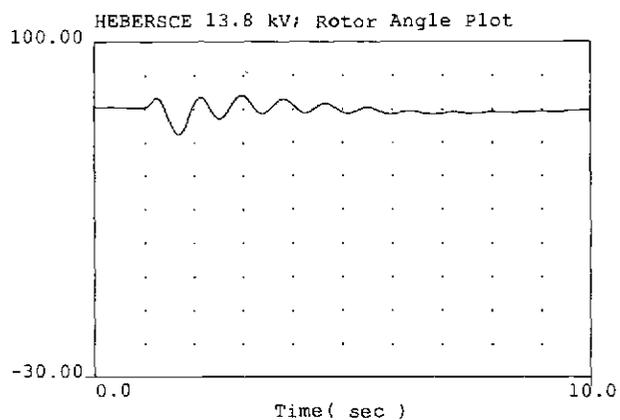
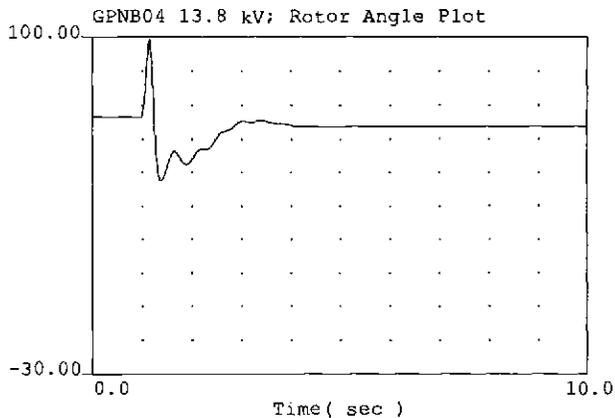
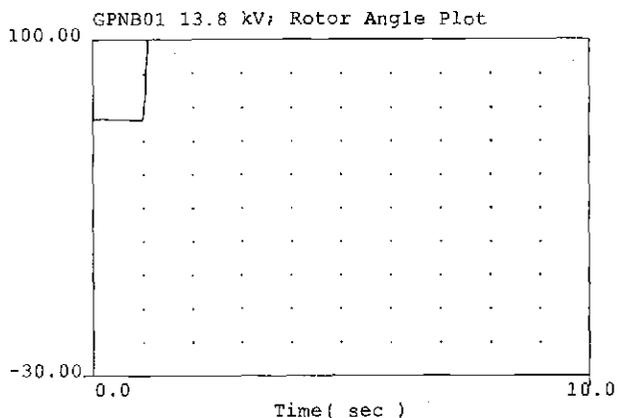
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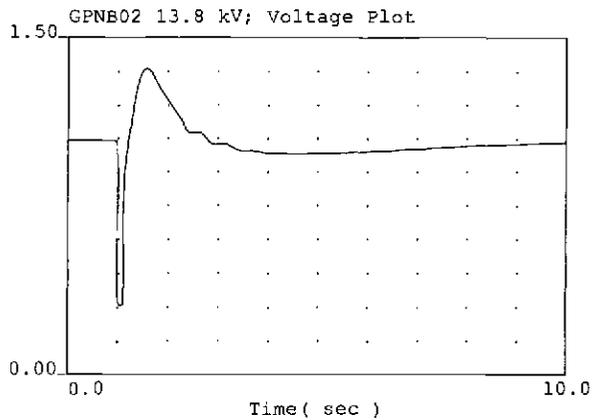
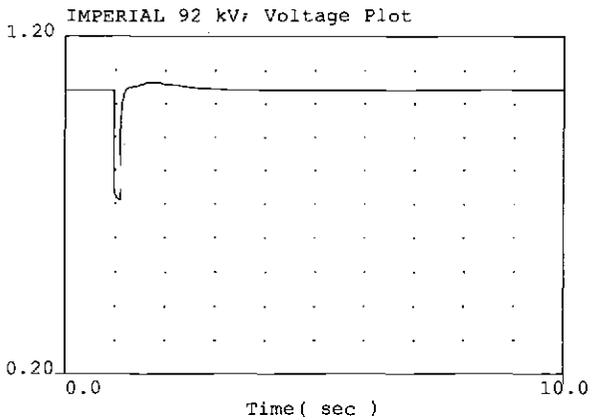
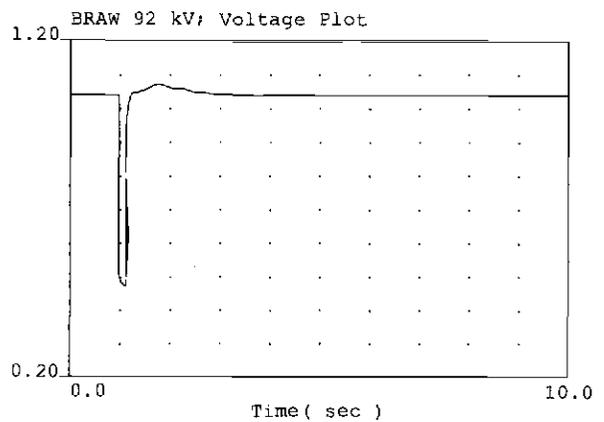
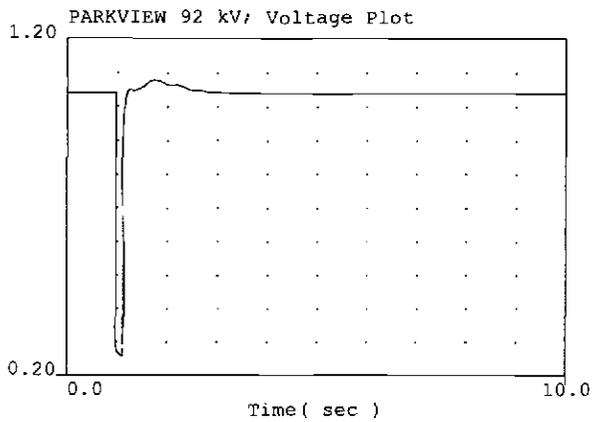
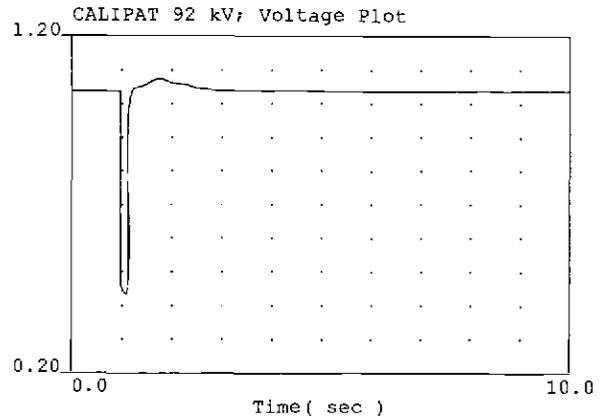
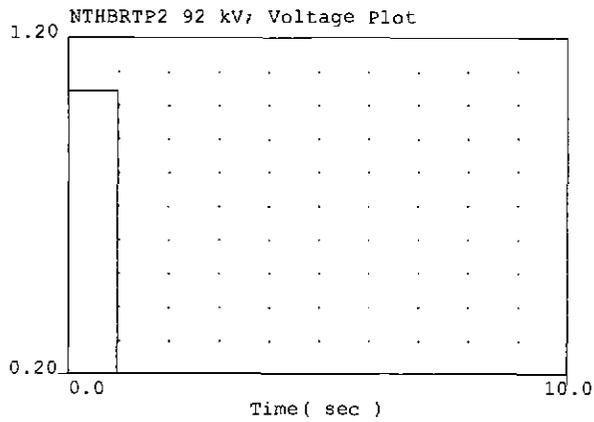
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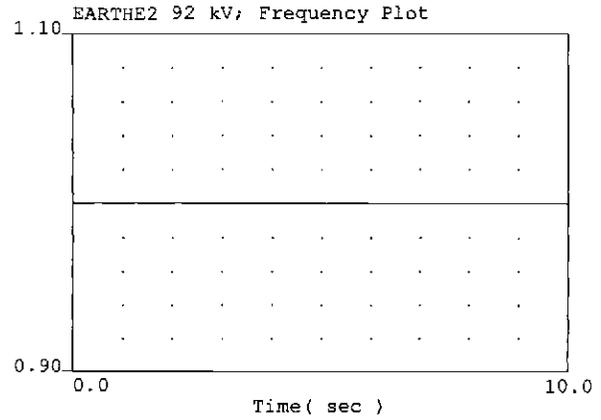
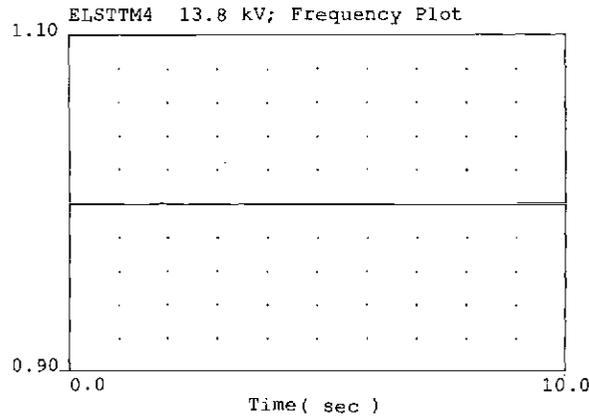
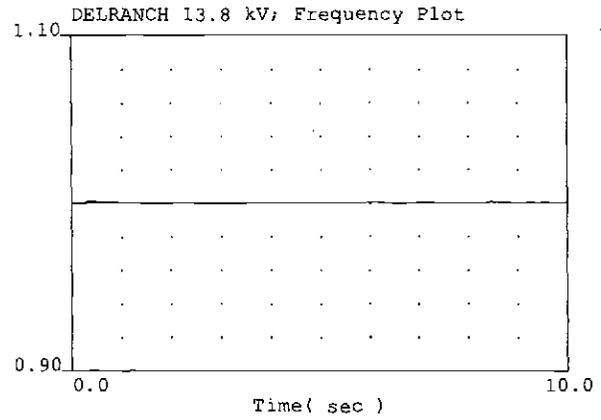
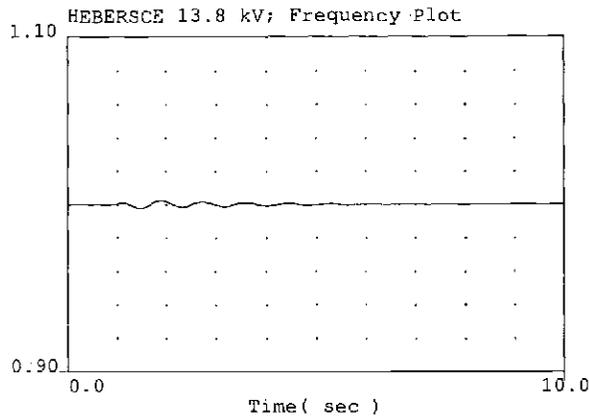
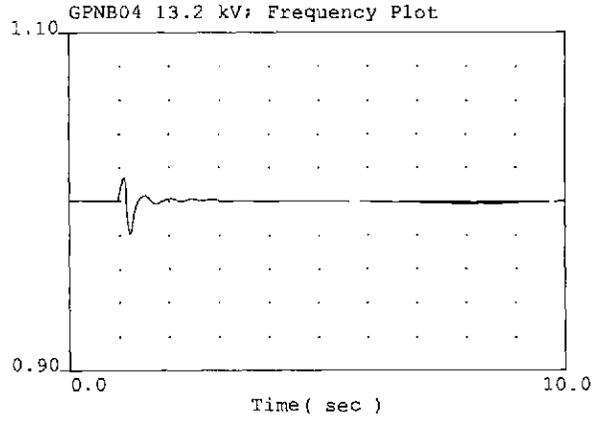
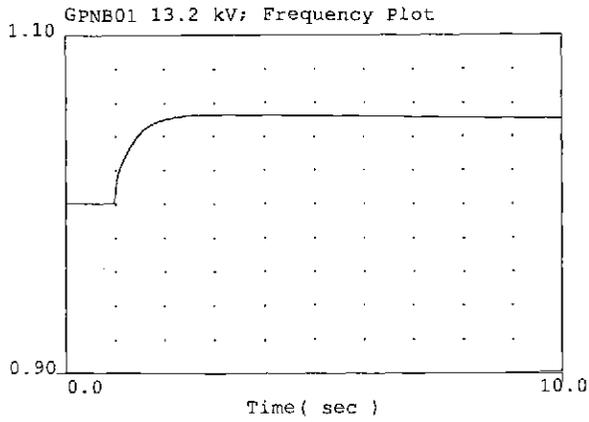
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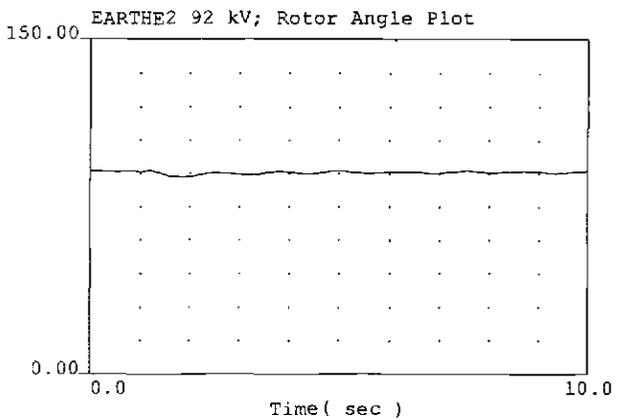
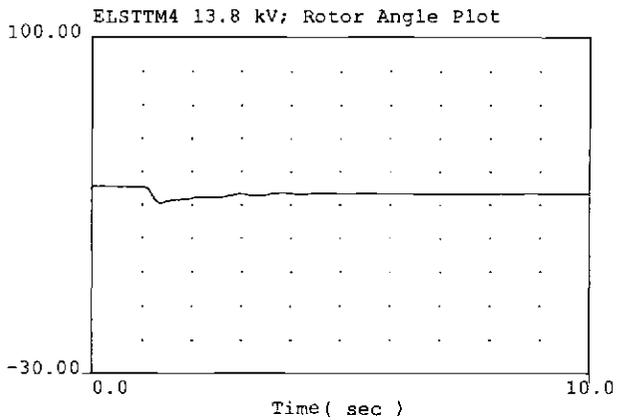
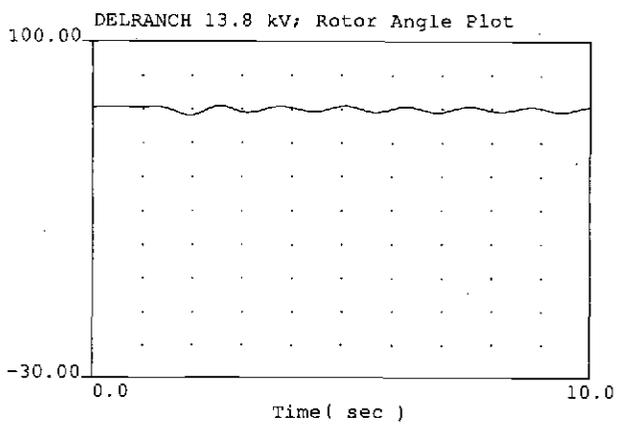
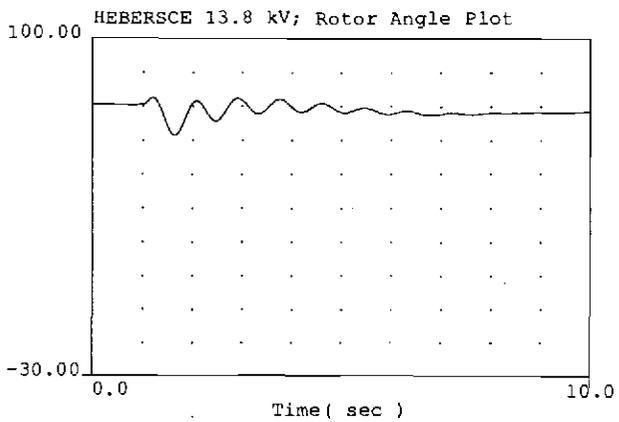
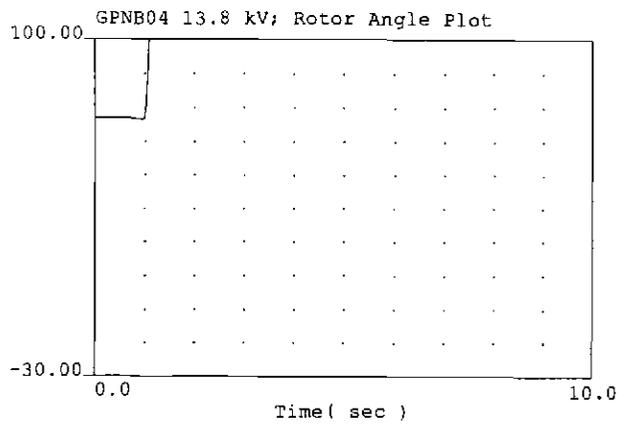
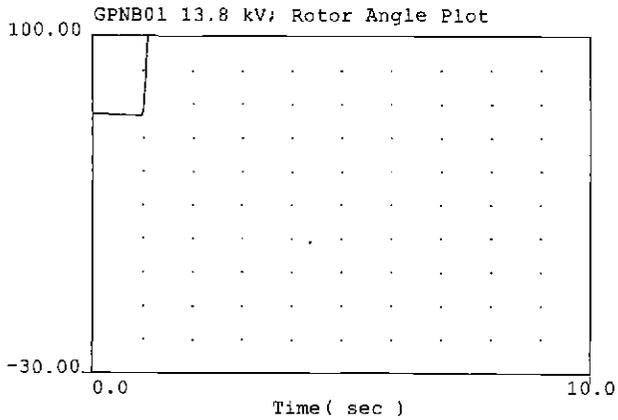
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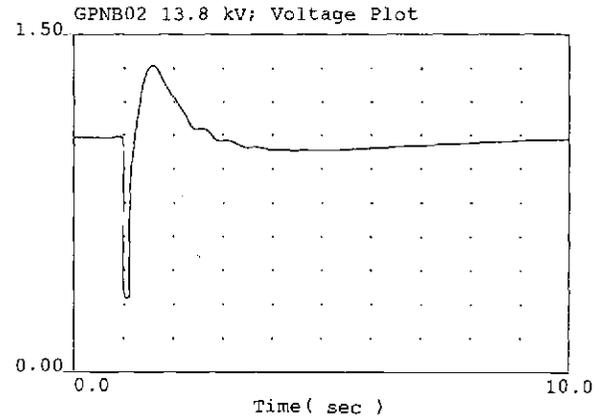
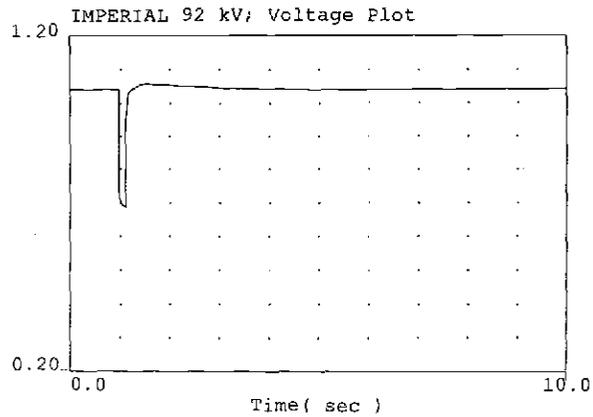
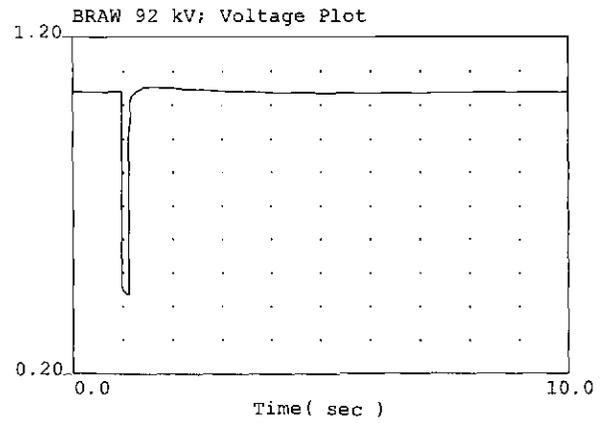
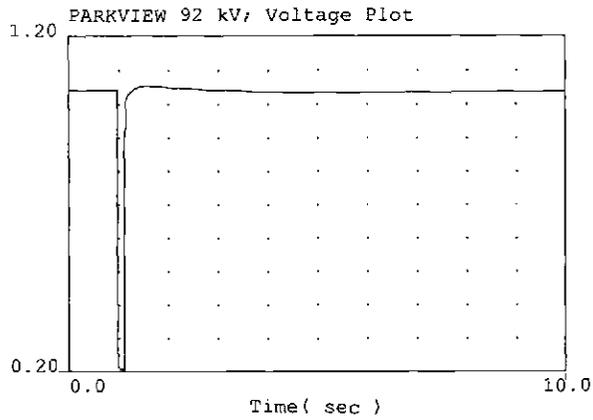
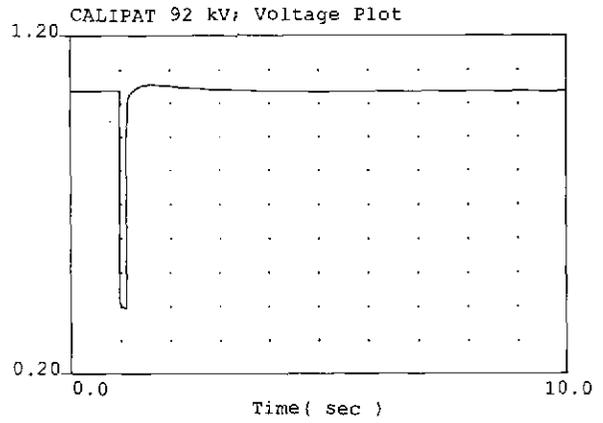
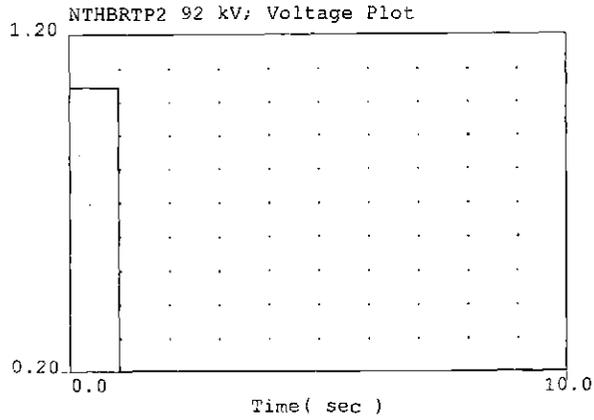
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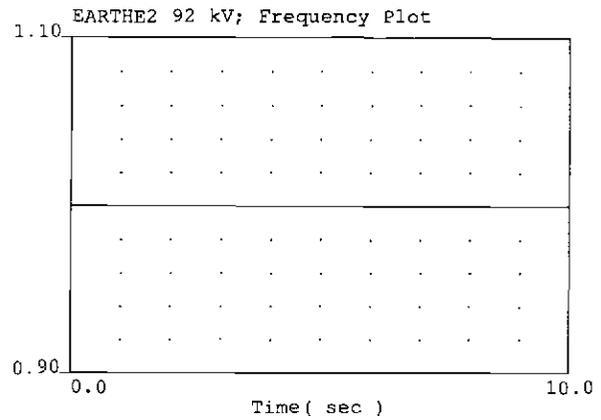
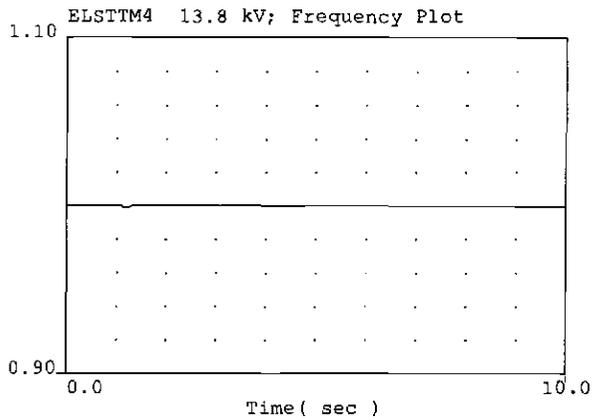
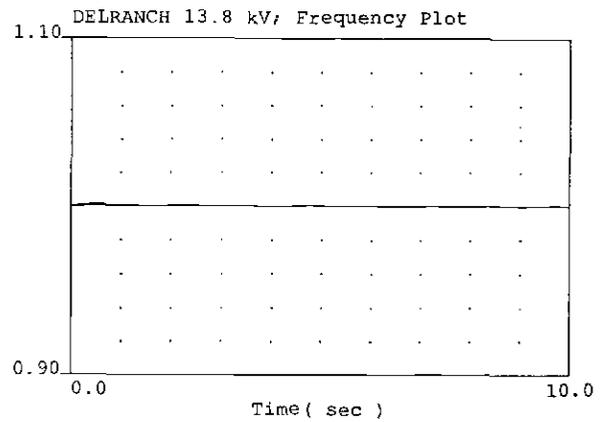
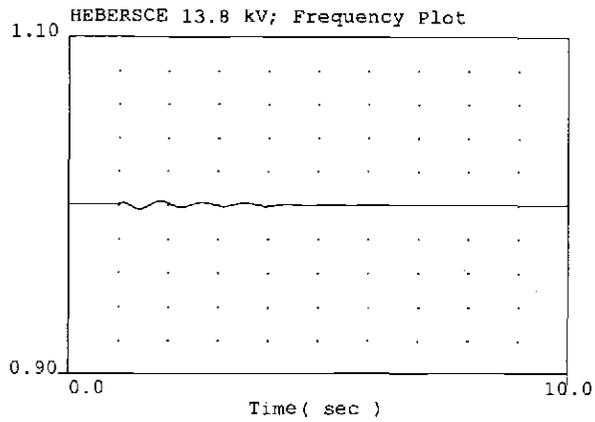
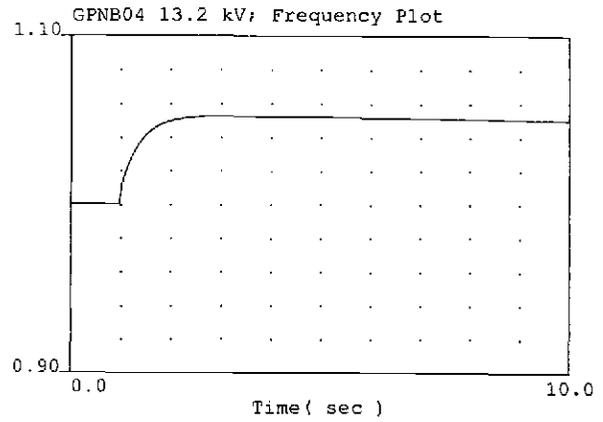
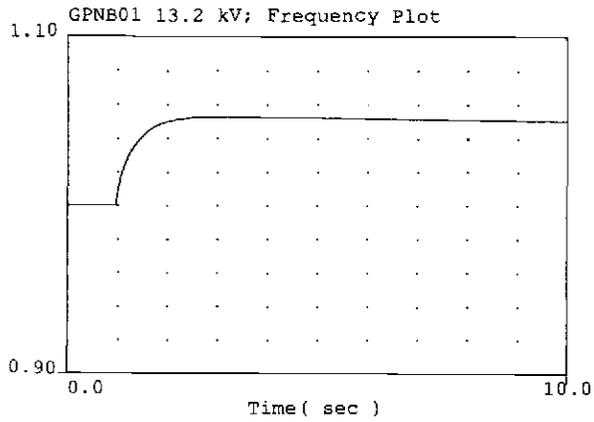
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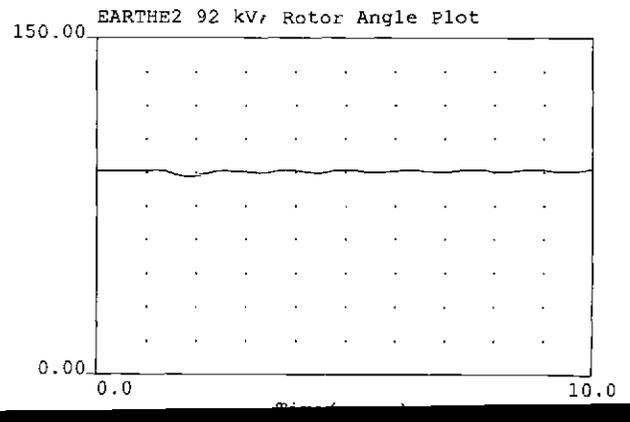
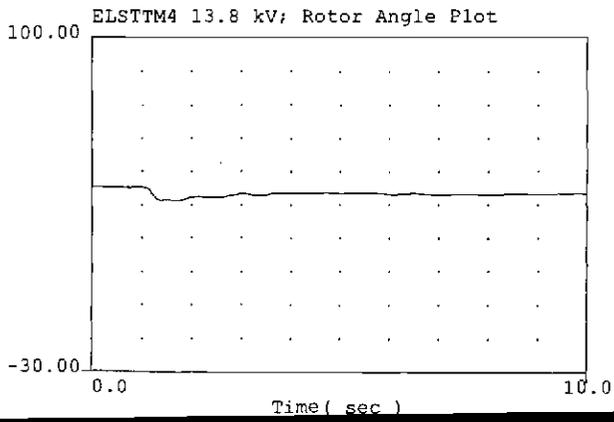
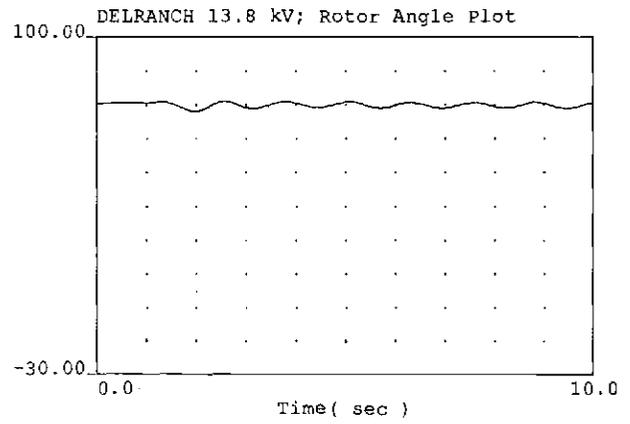
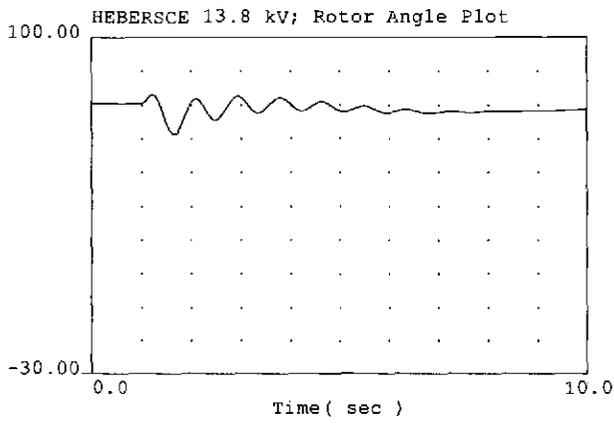
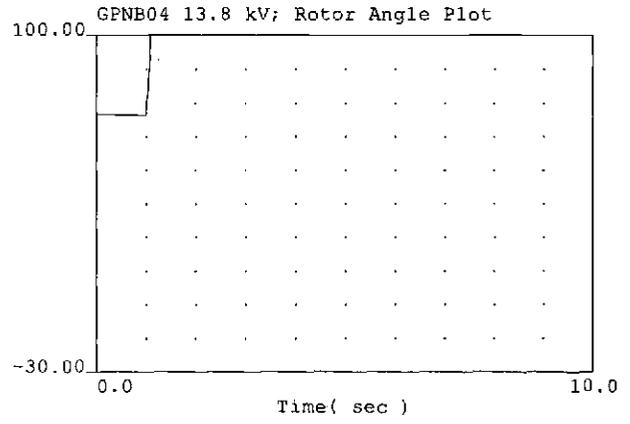
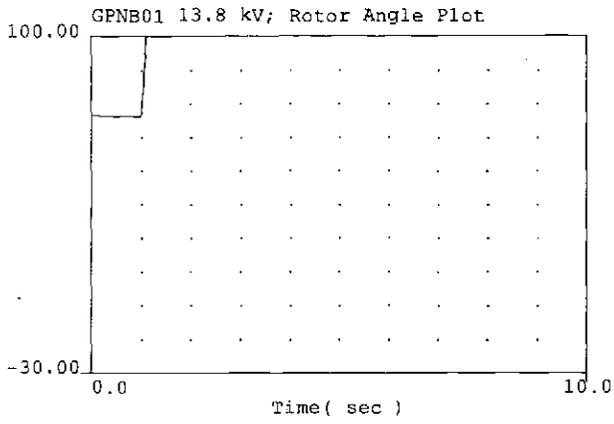
150 MW North Brawley Geothermal Project



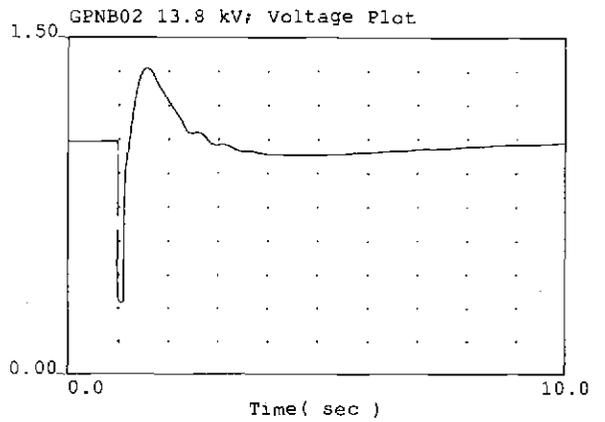
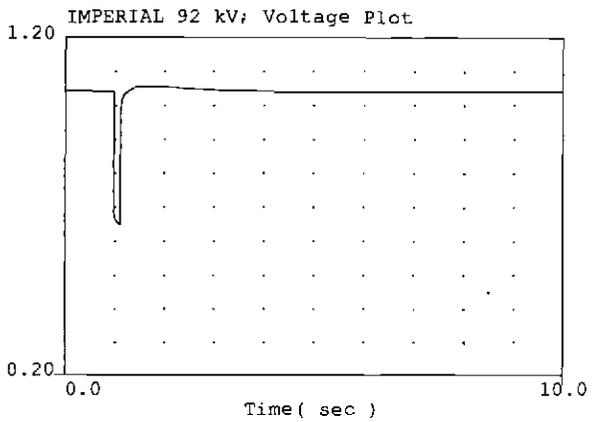
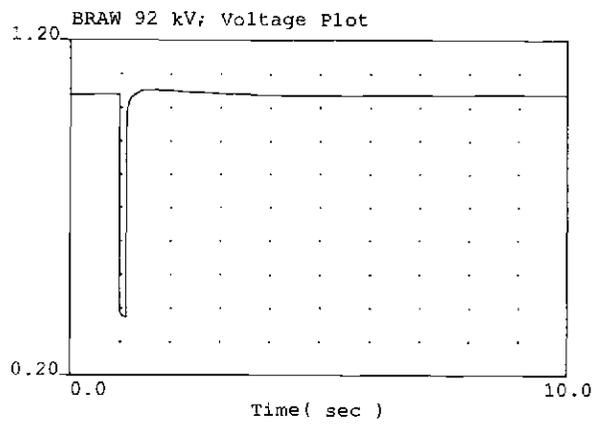
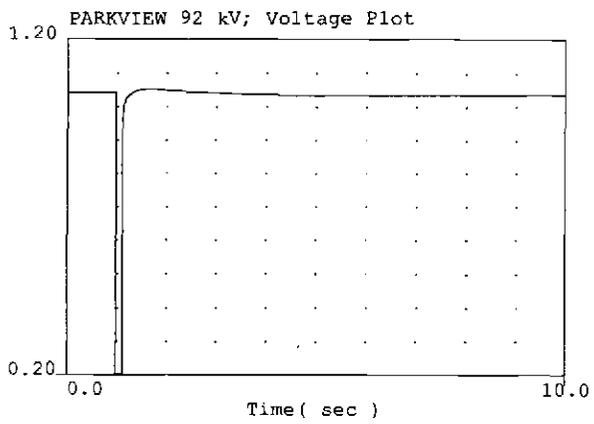
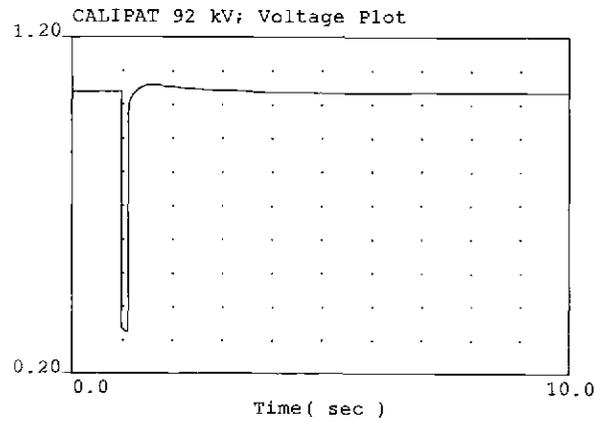
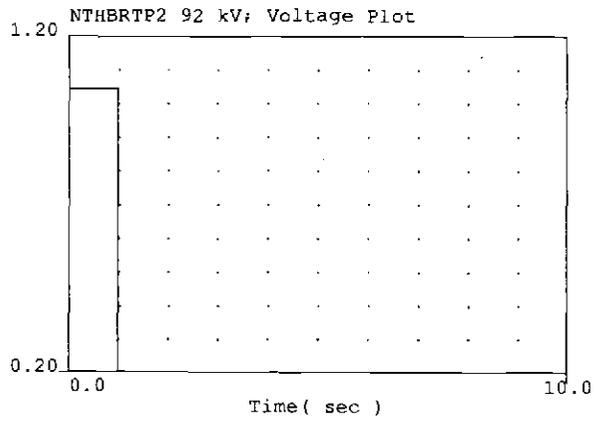
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150 MW North Brawley Geothermal Project



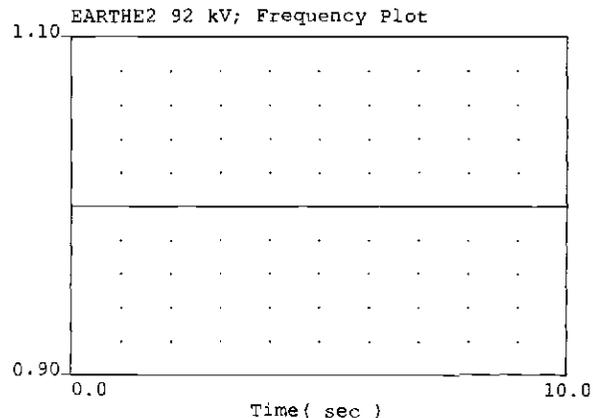
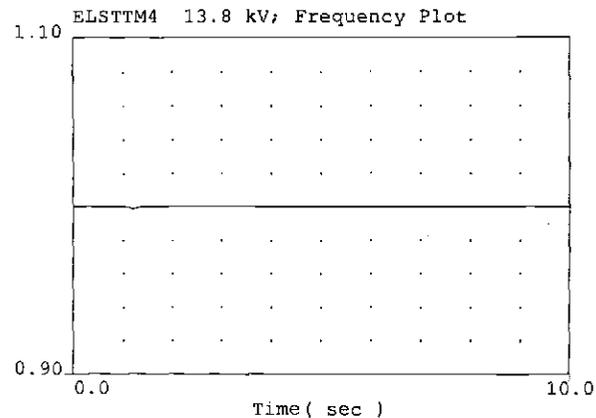
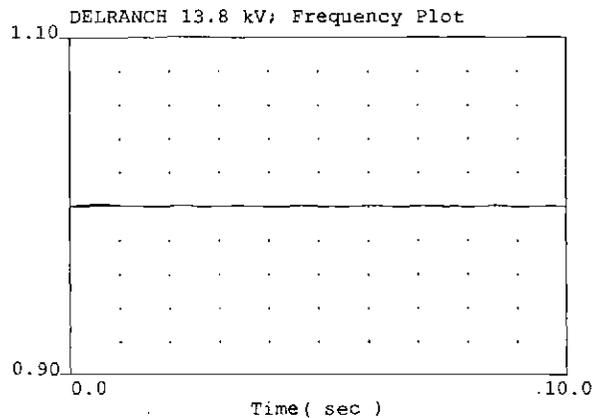
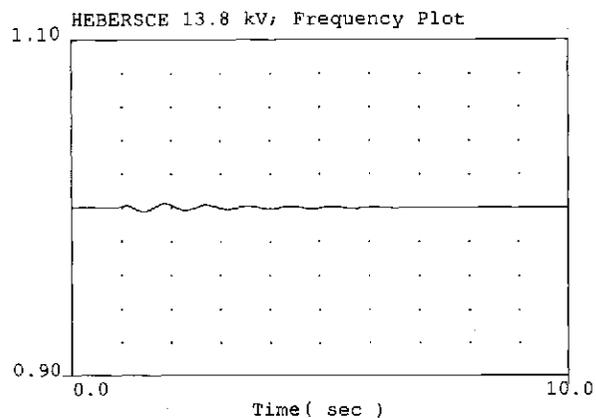
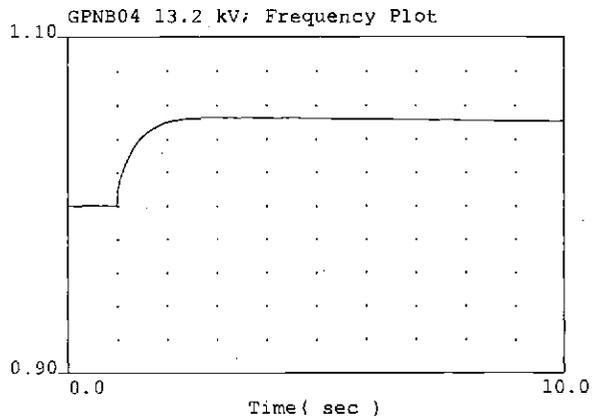
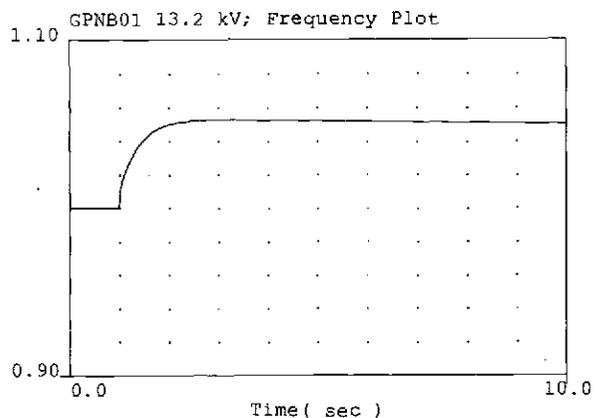
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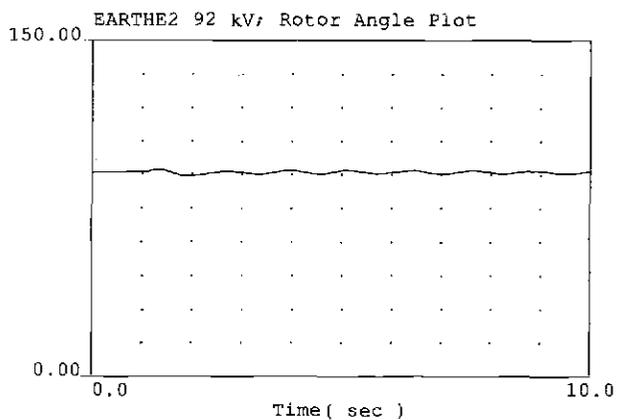
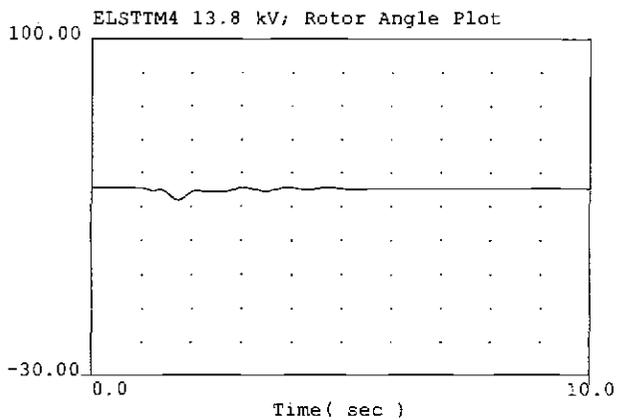
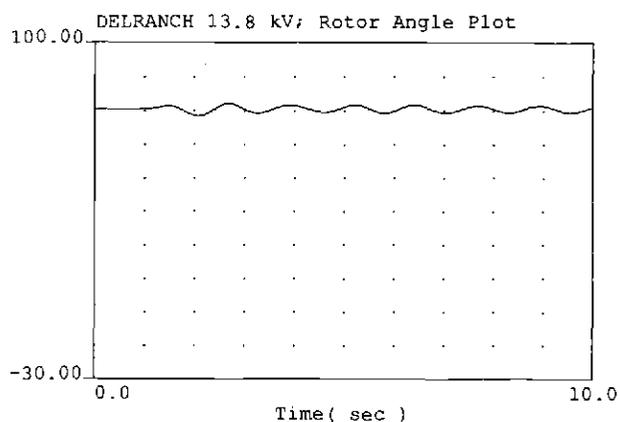
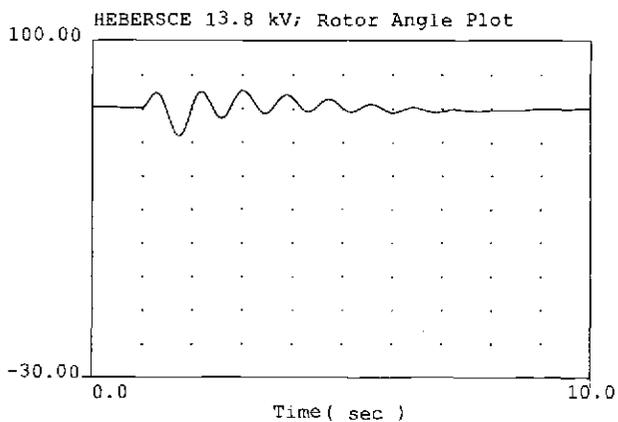
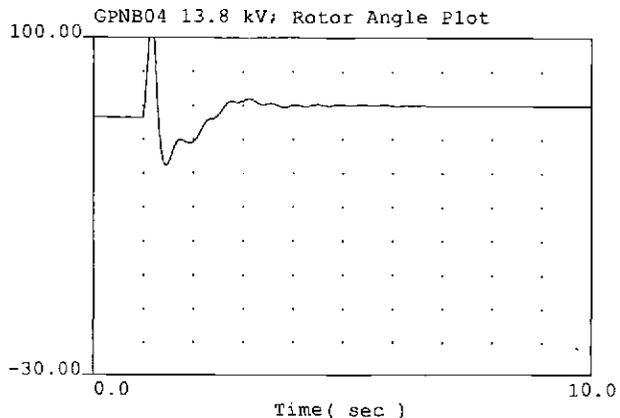
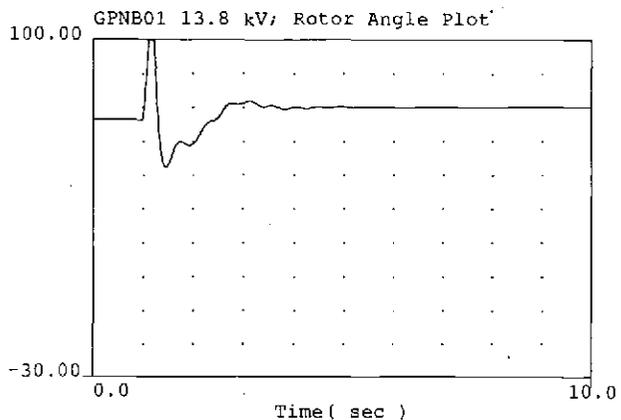
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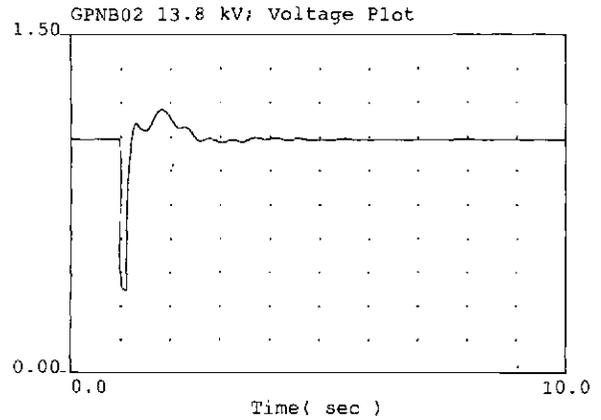
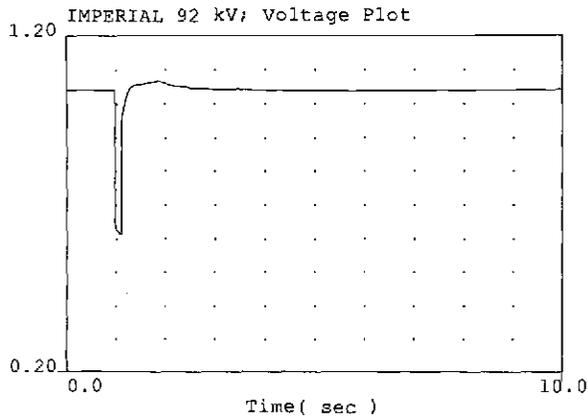
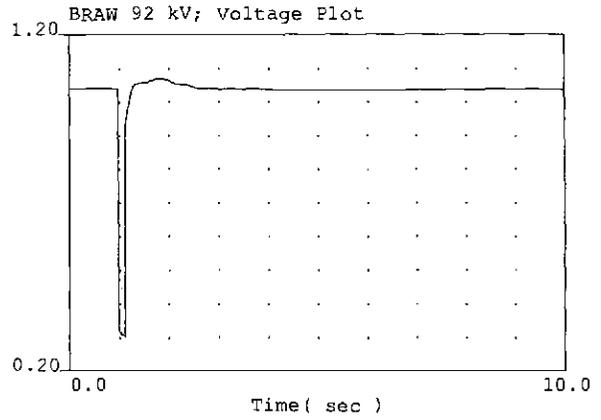
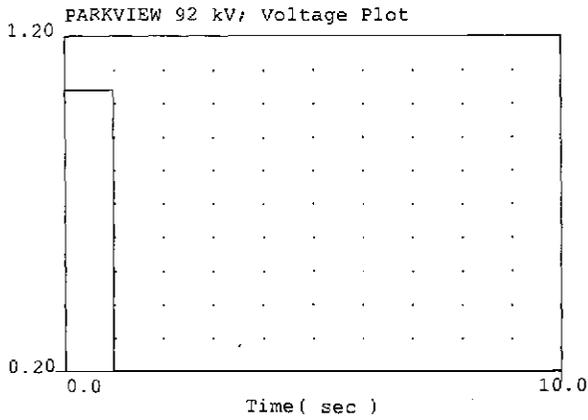
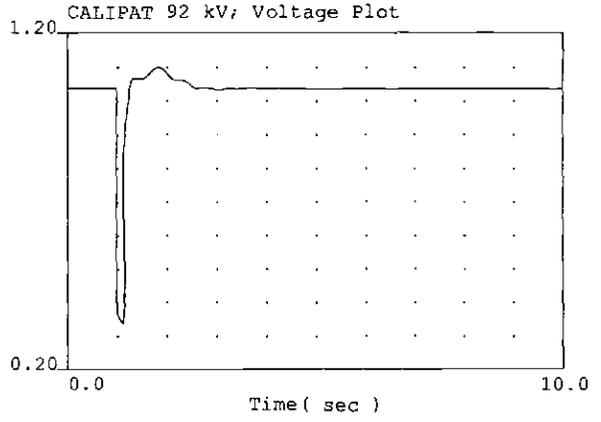
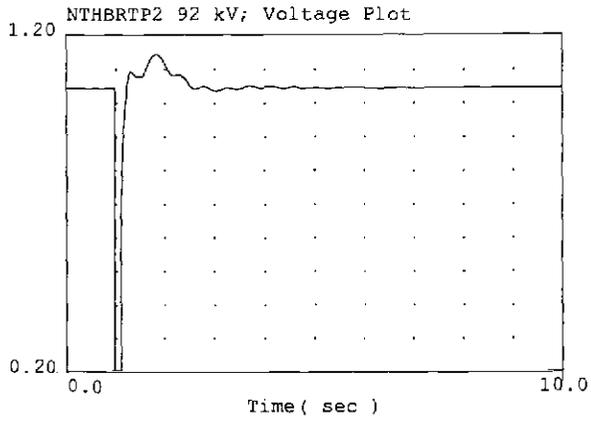
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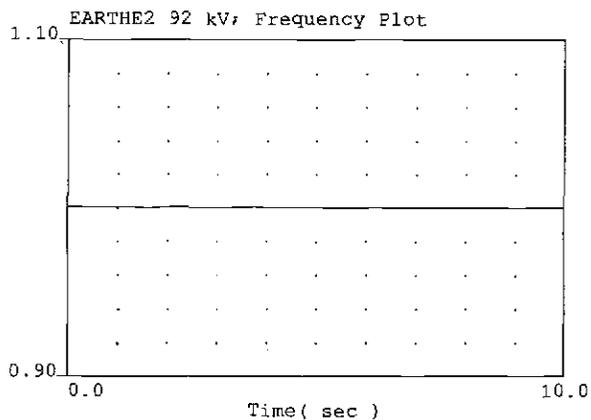
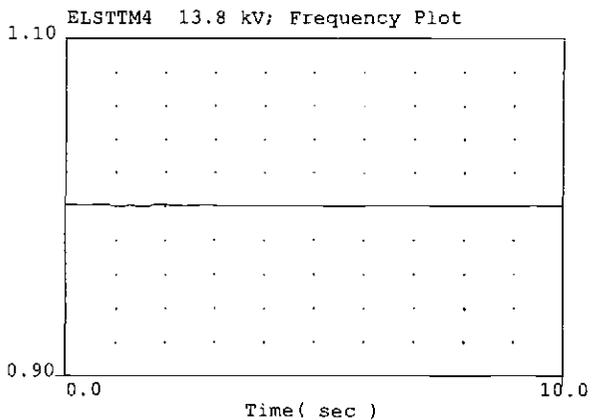
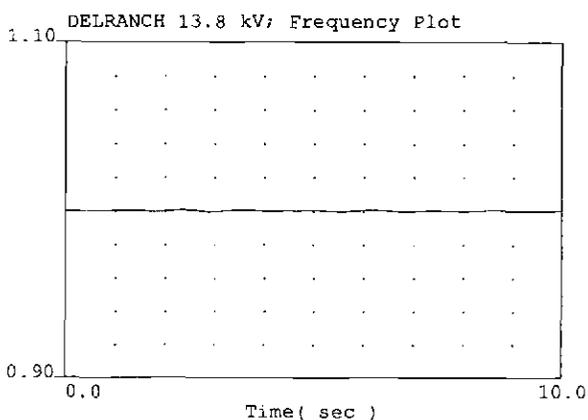
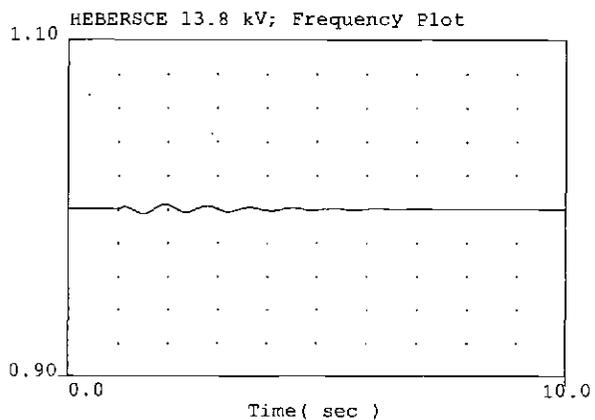
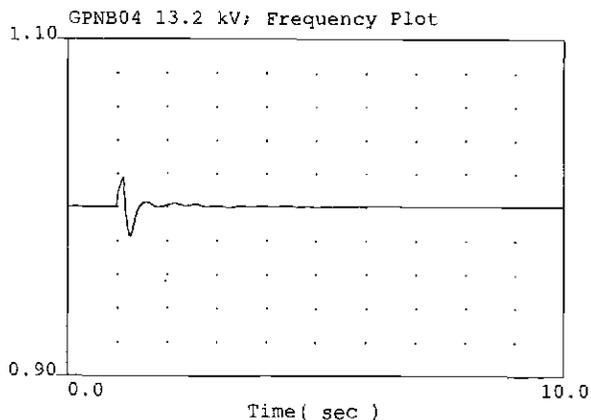
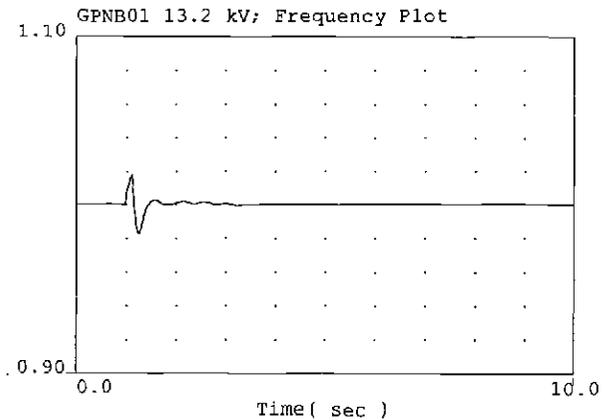
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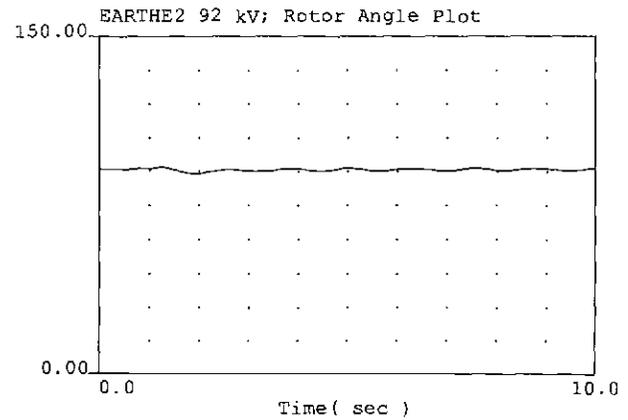
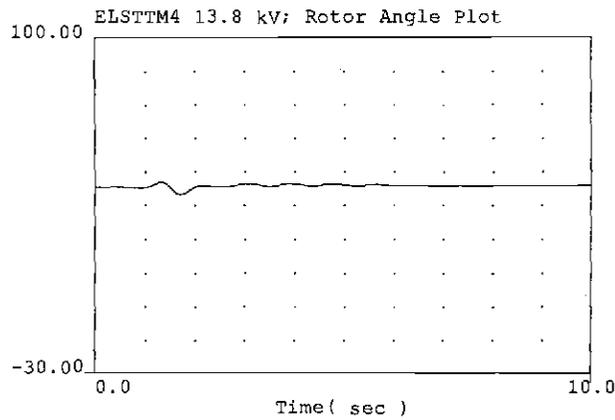
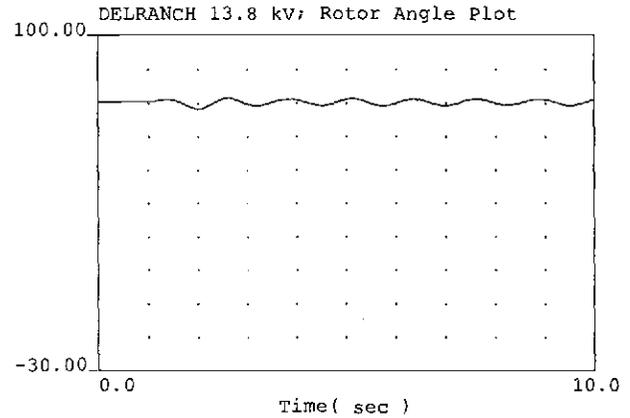
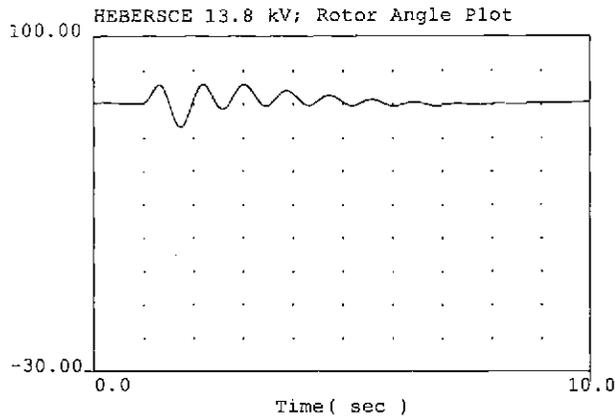
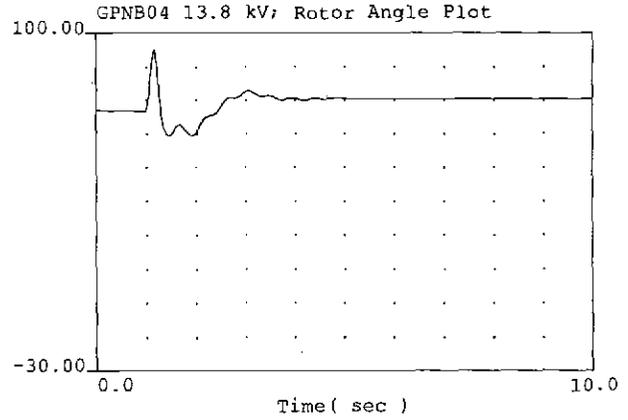
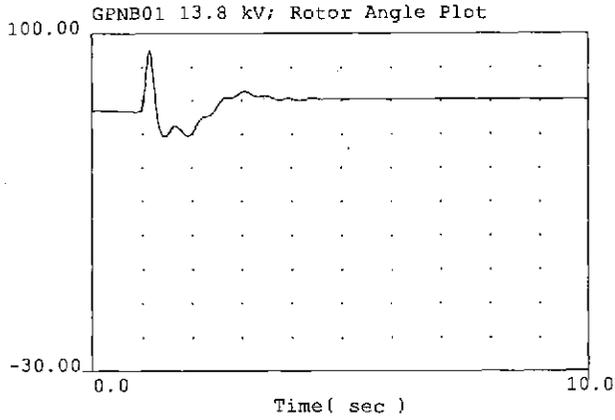
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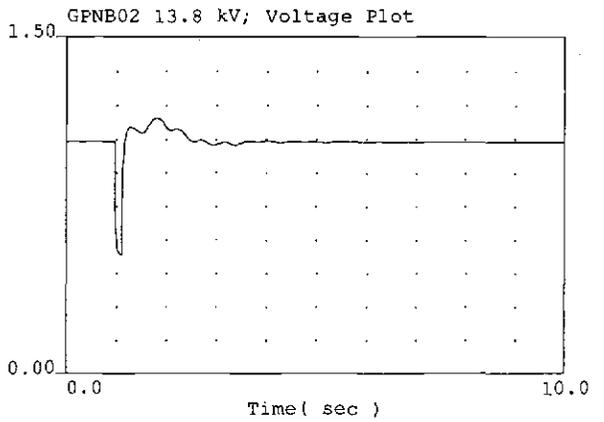
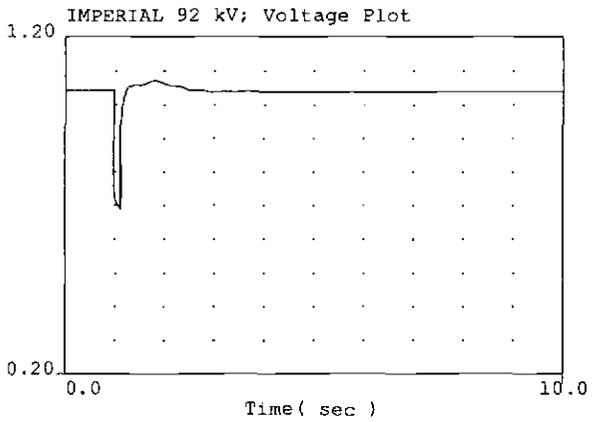
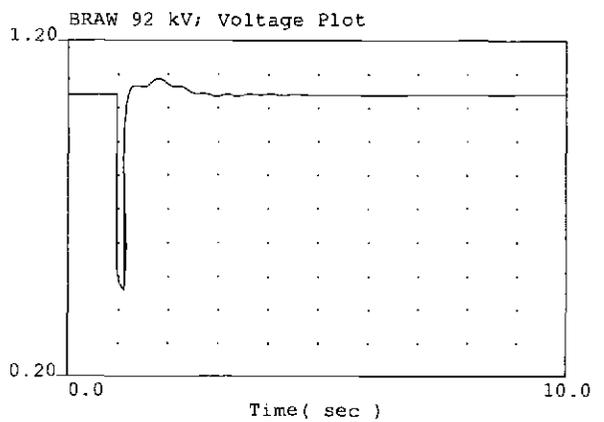
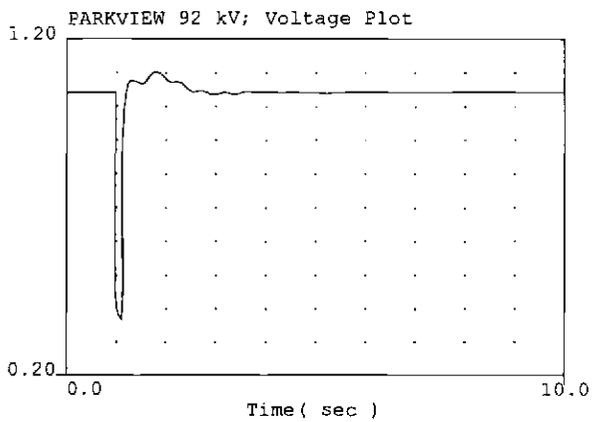
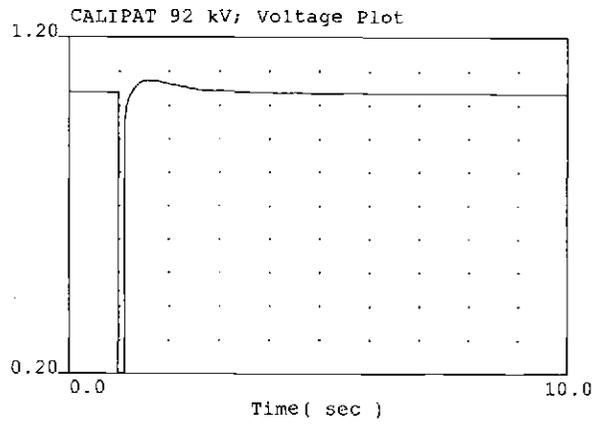
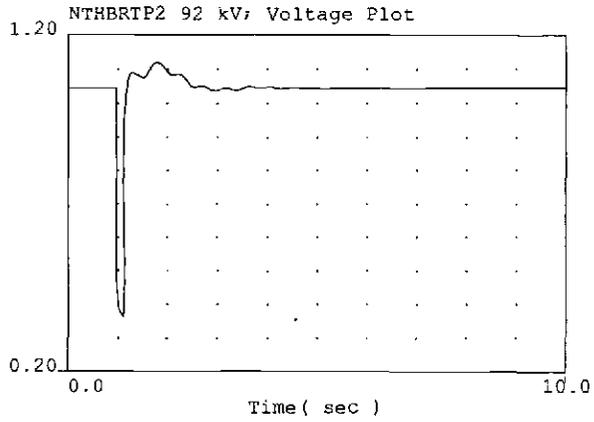
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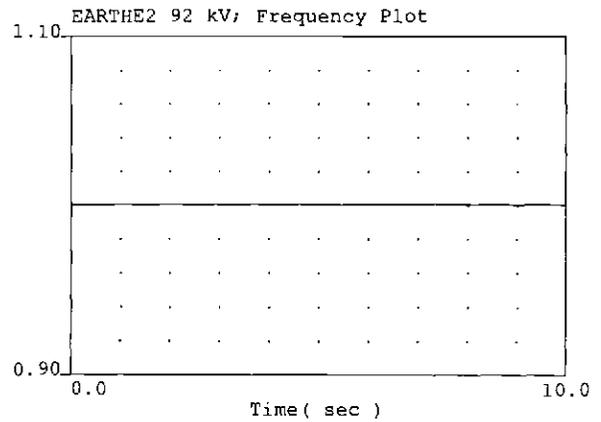
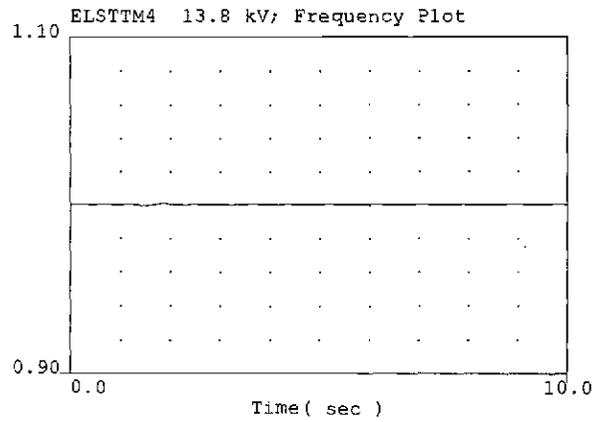
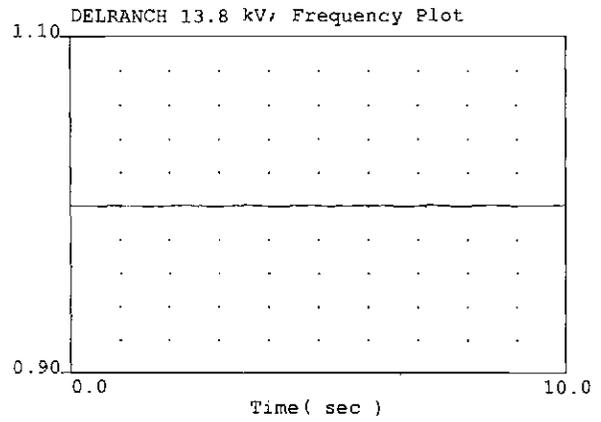
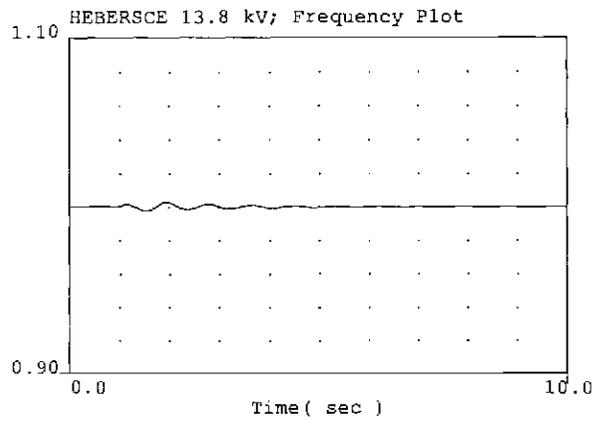
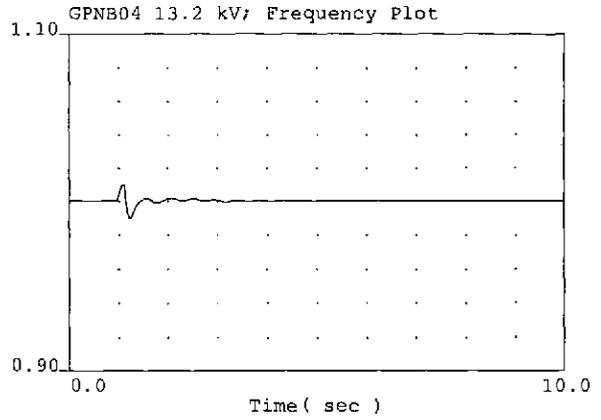
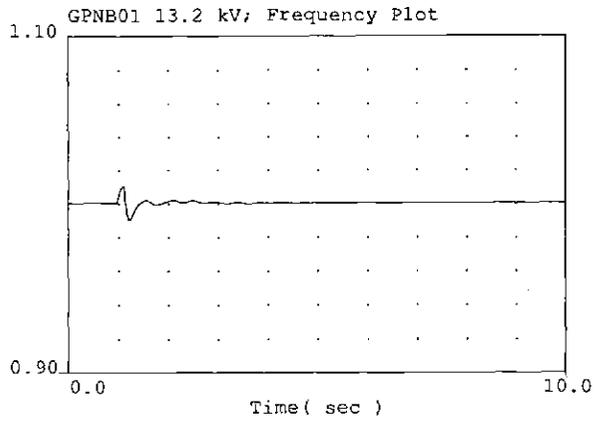
150 MW North Brawley Geothermal Project



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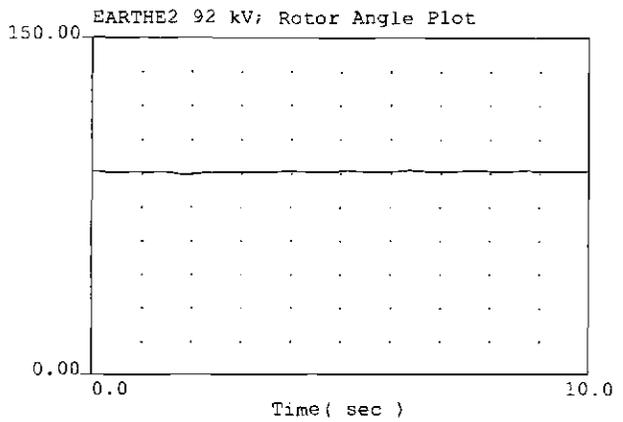
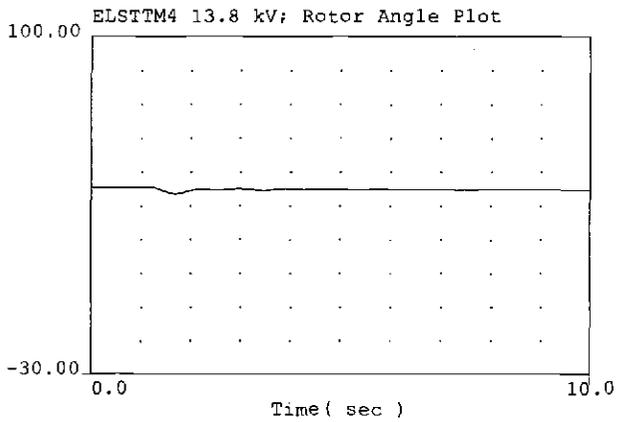
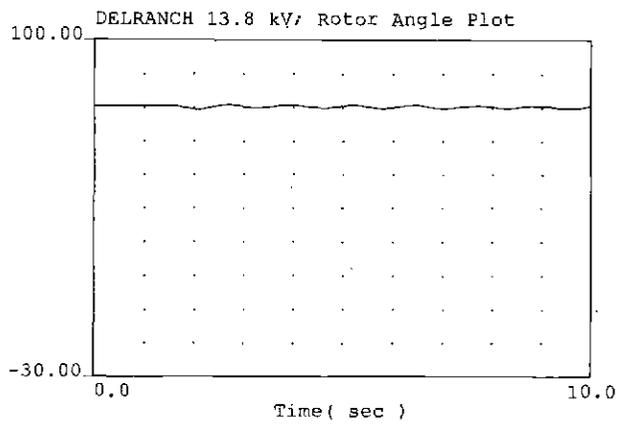
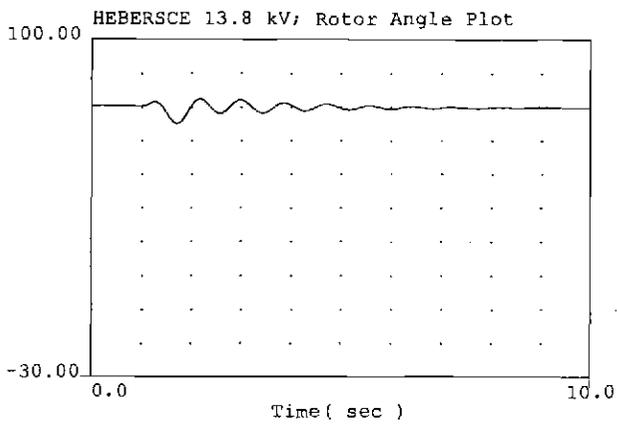
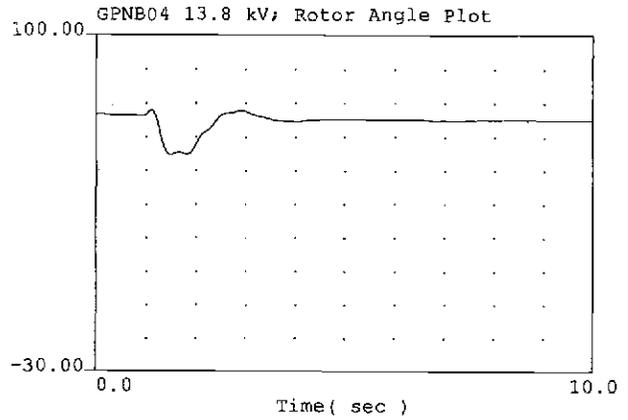
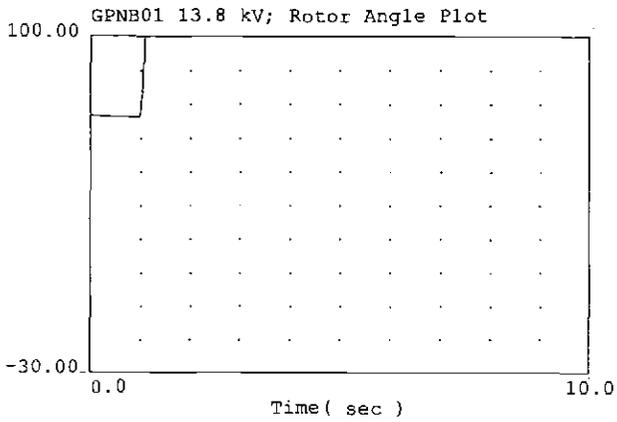
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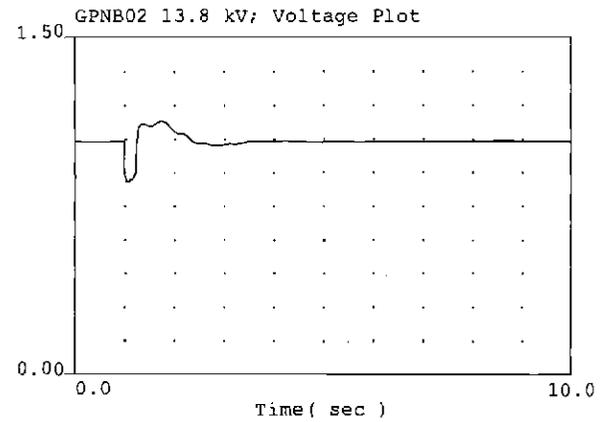
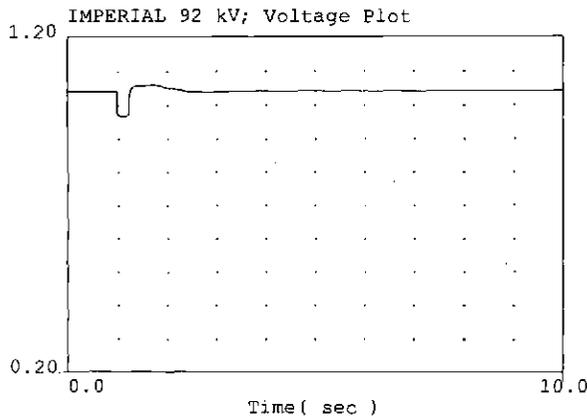
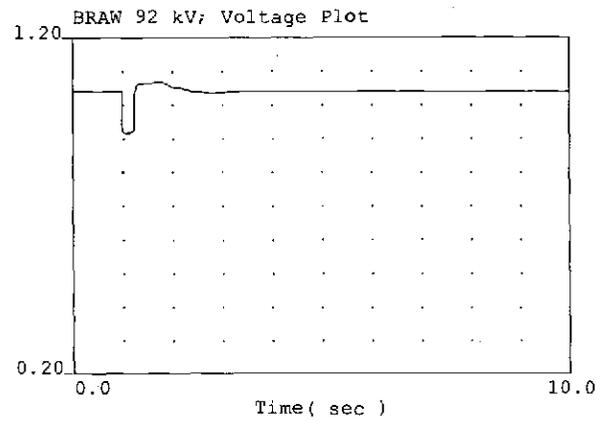
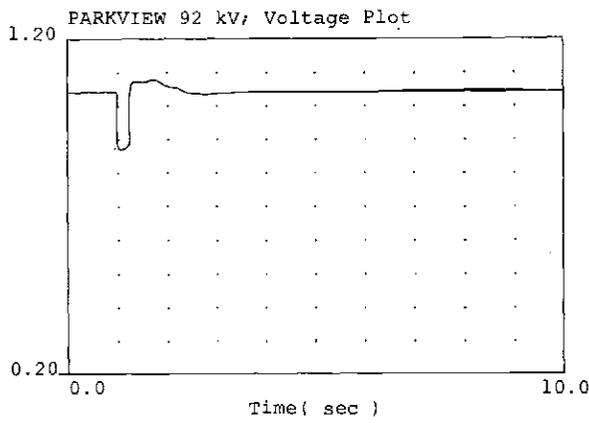
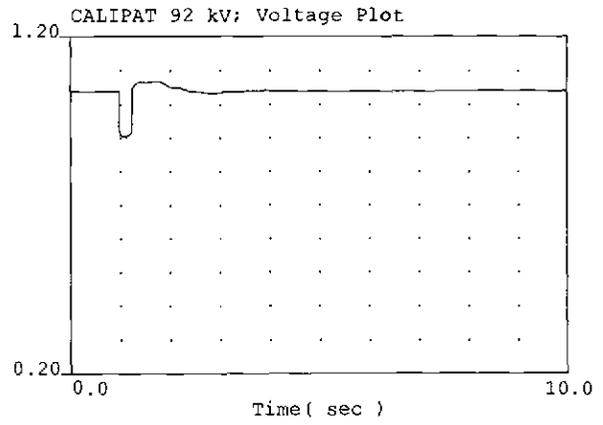
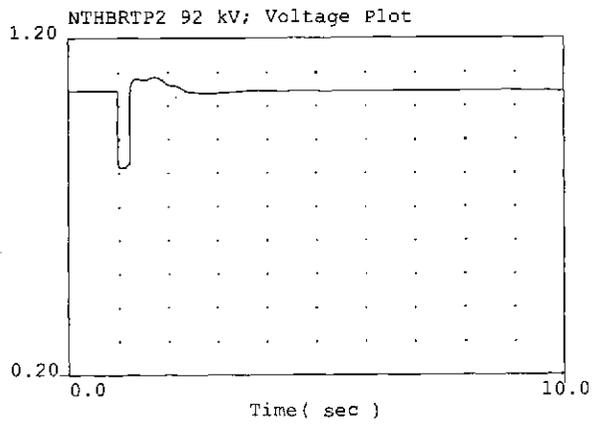
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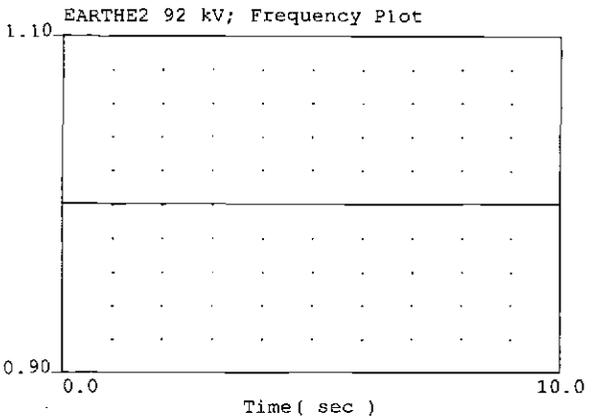
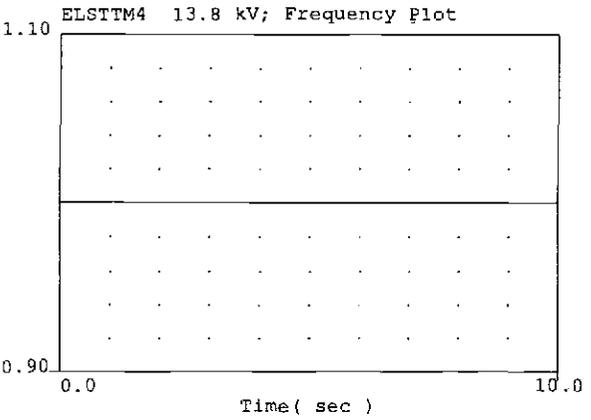
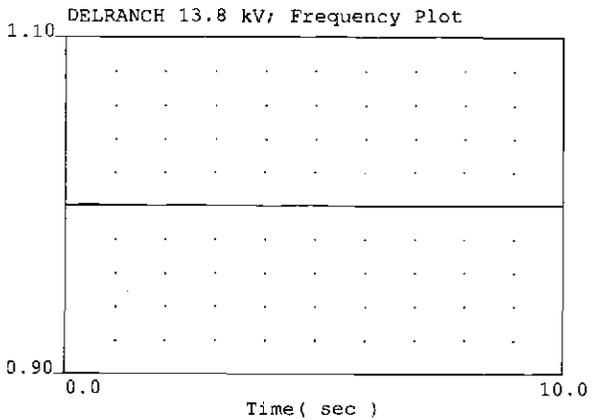
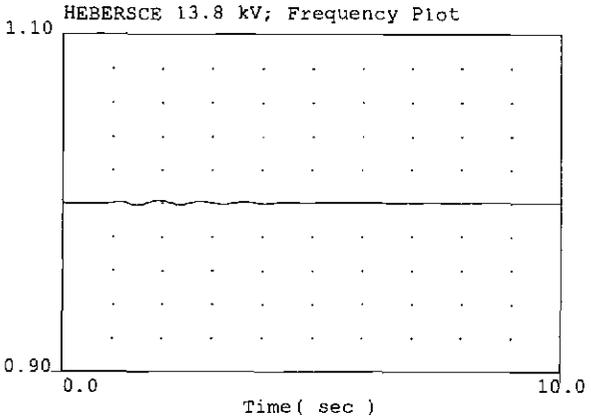
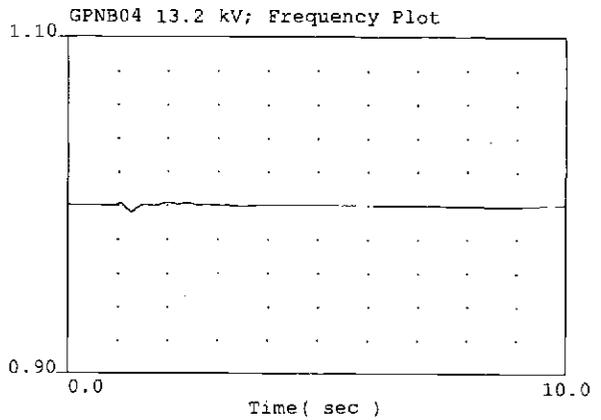
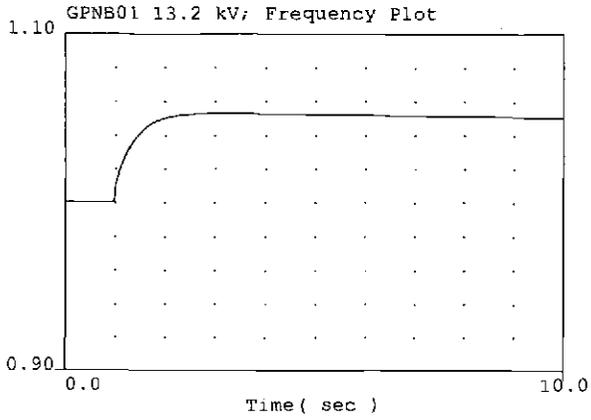
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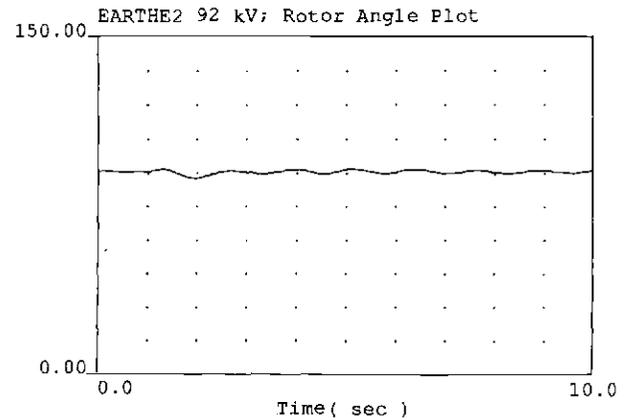
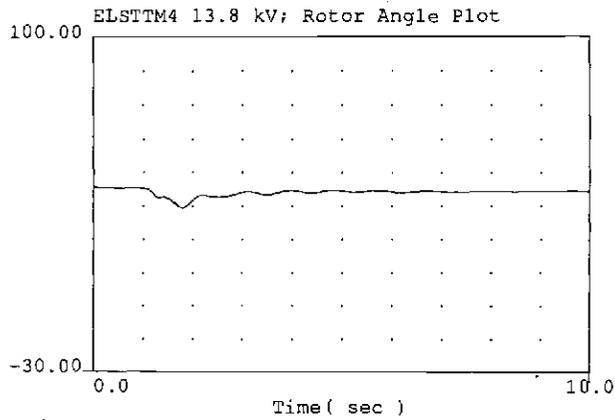
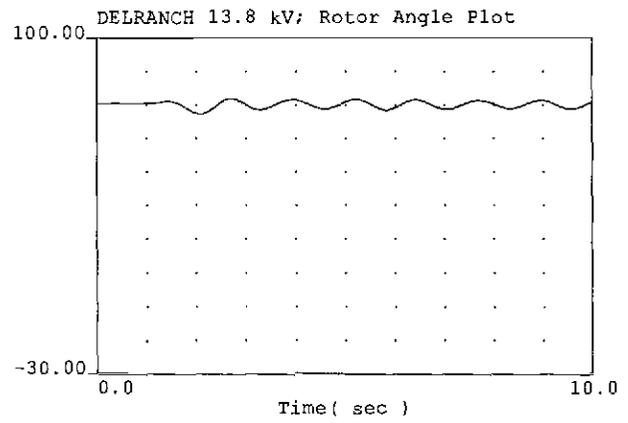
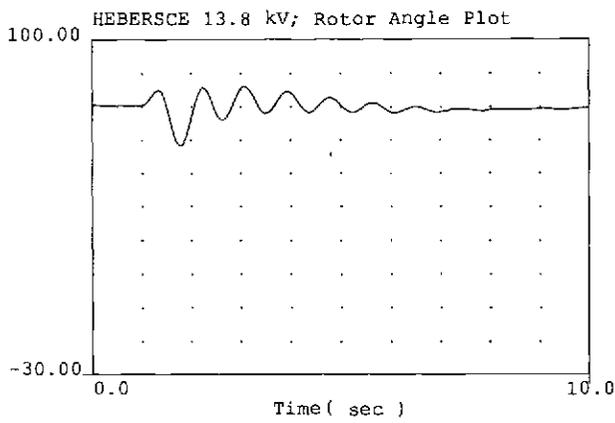
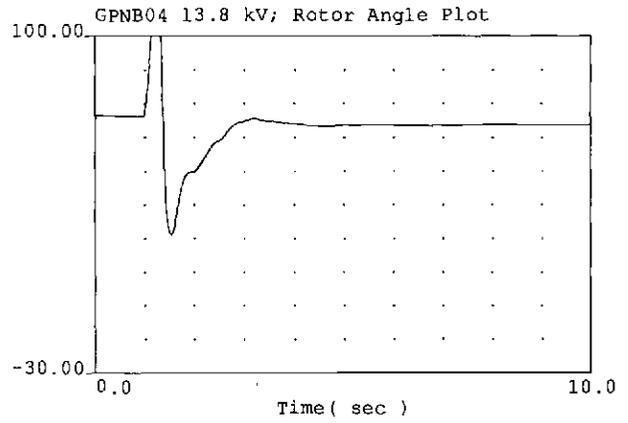
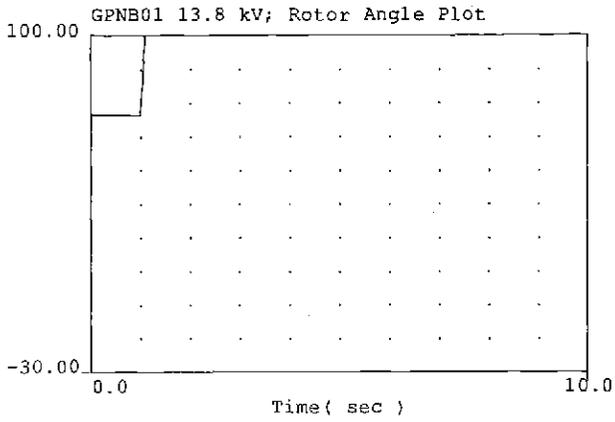
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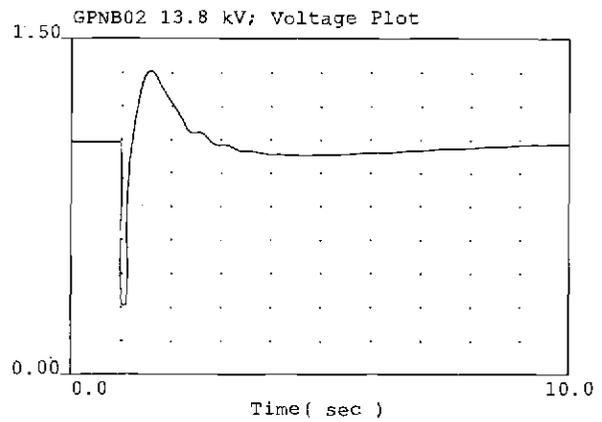
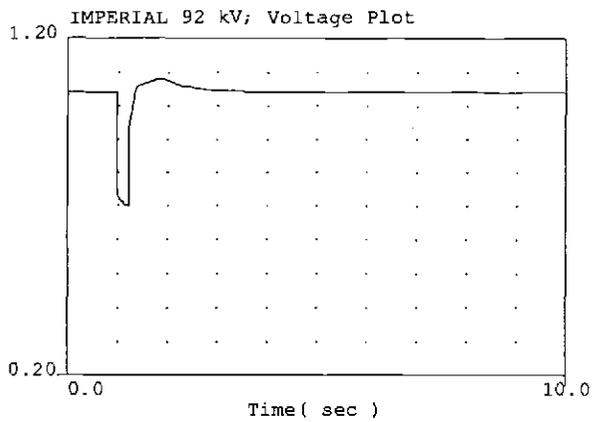
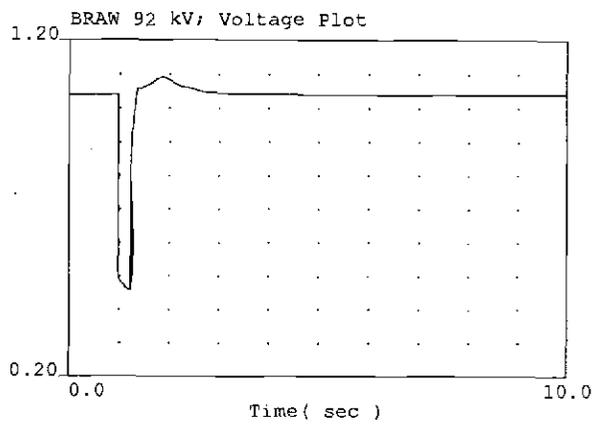
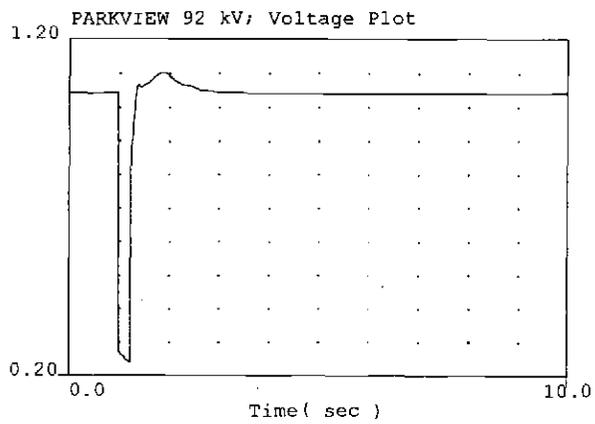
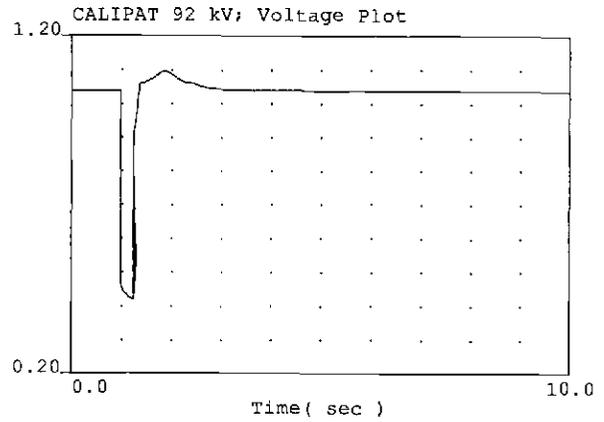
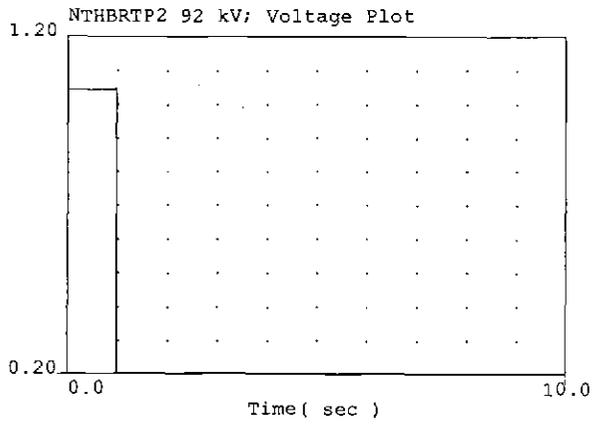
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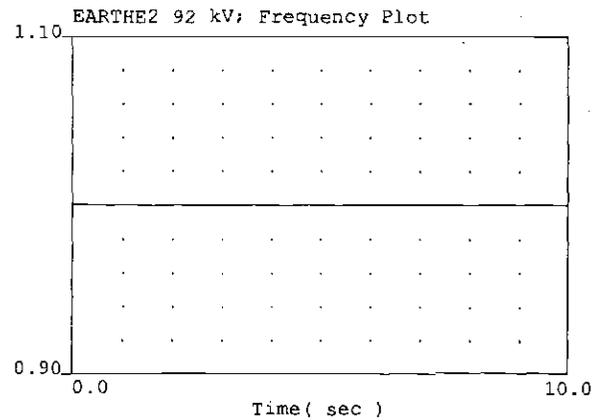
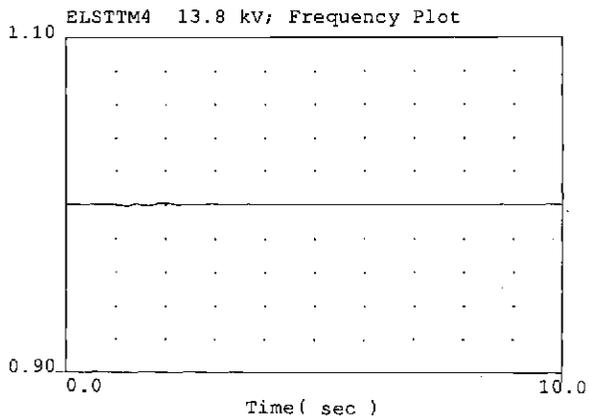
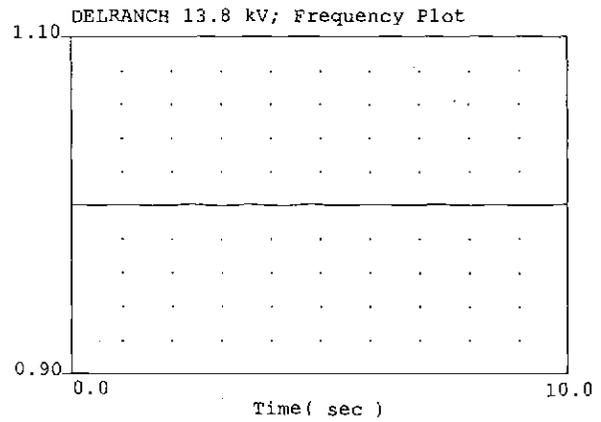
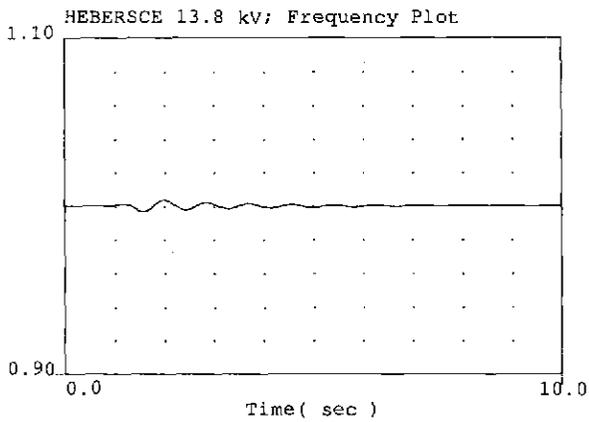
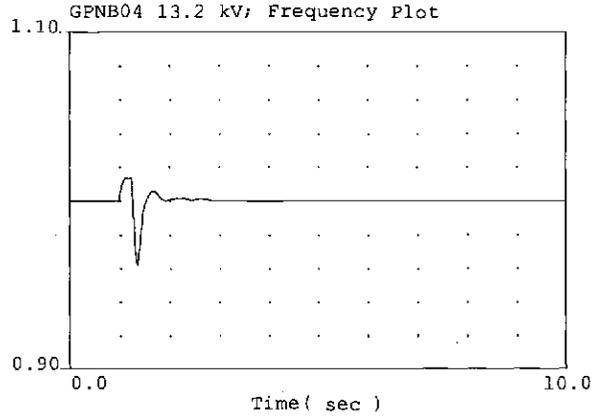
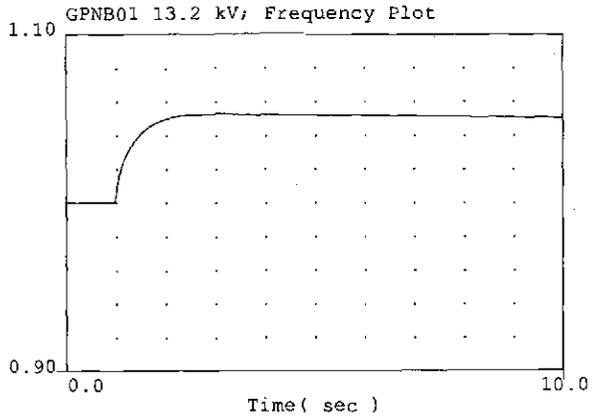
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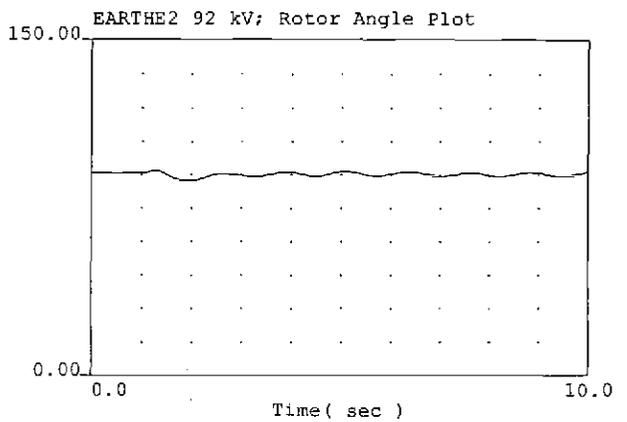
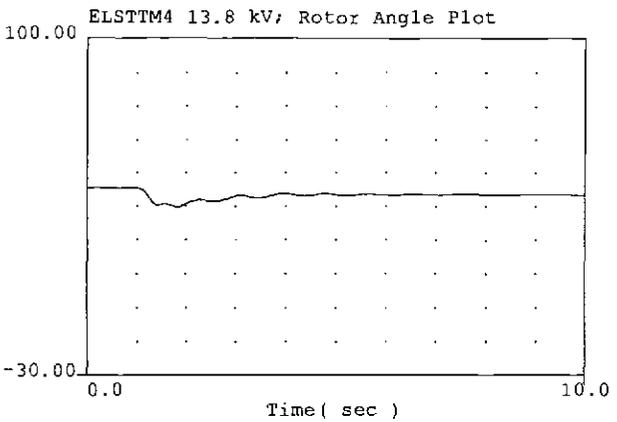
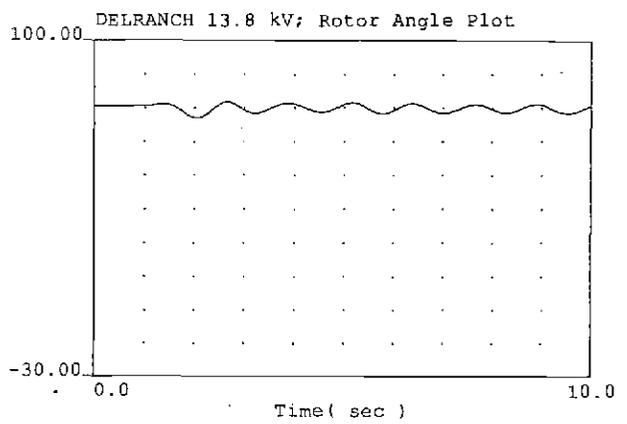
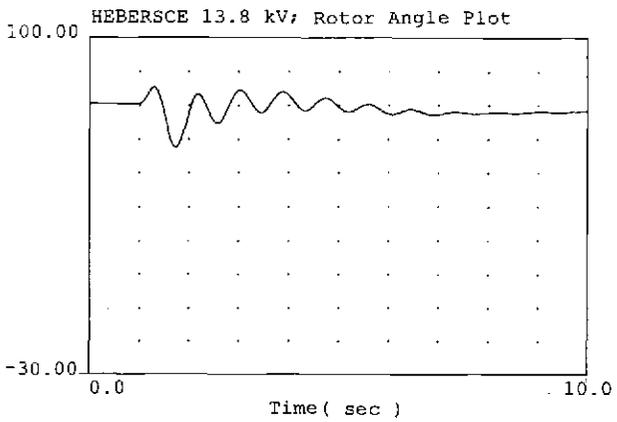
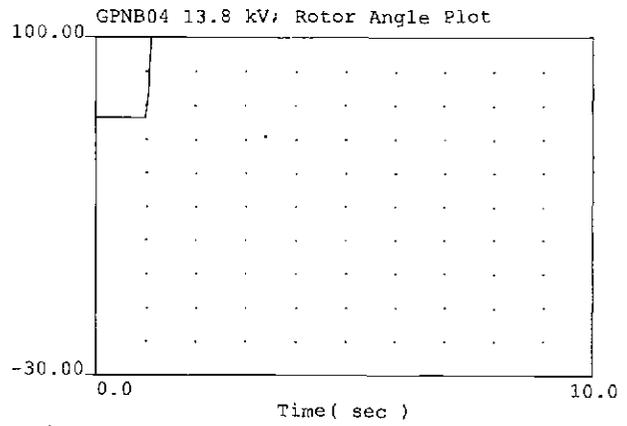
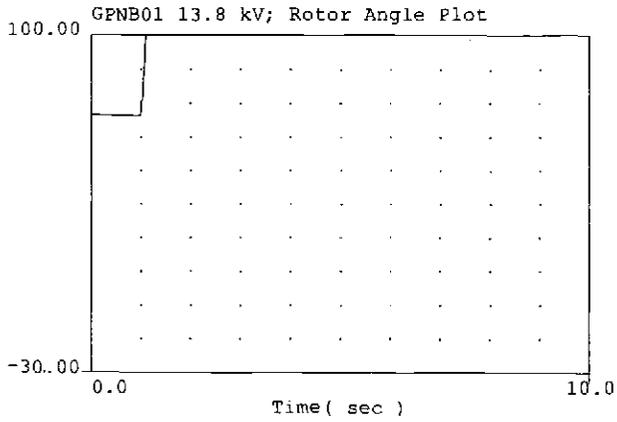
150 MW North Brawley Geothermal Project



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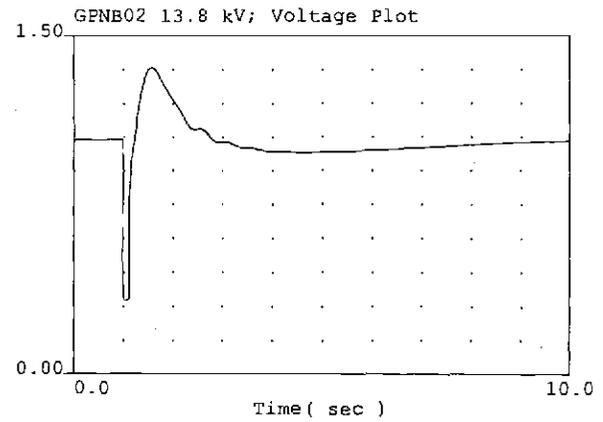
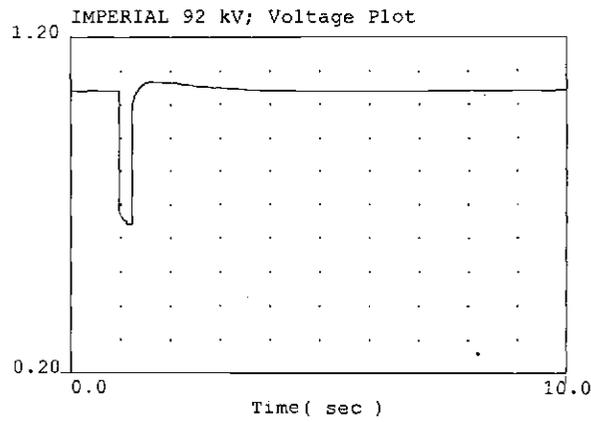
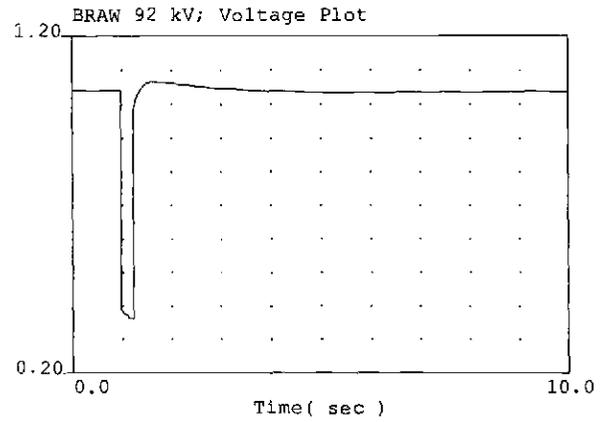
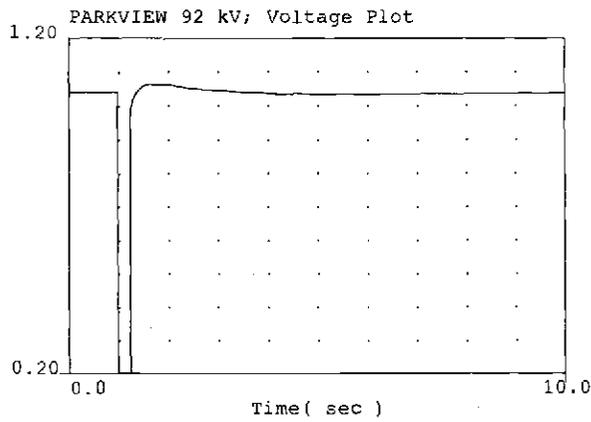
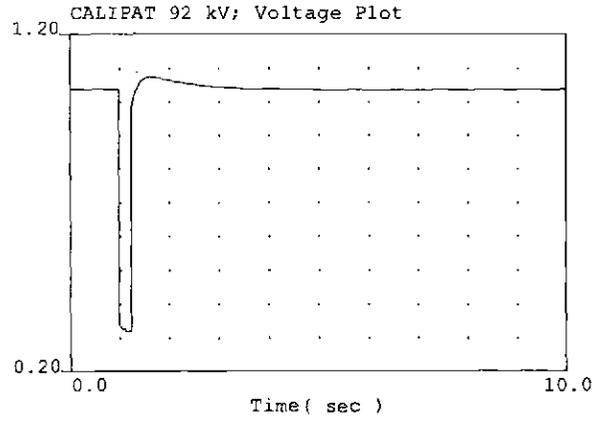
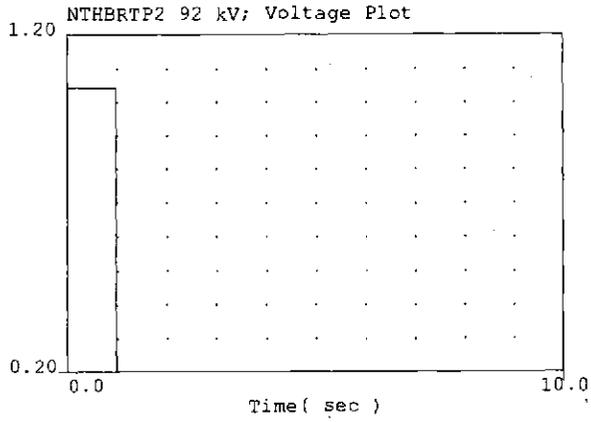
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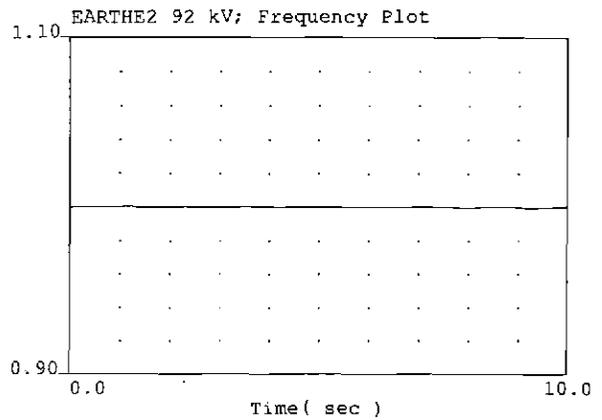
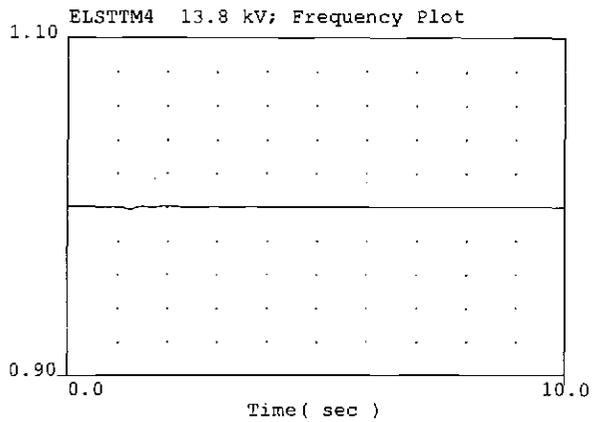
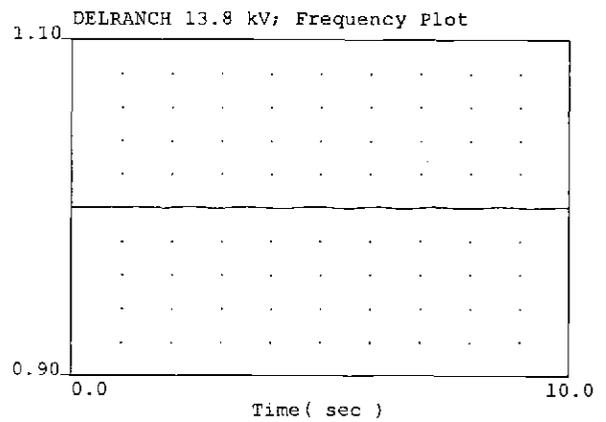
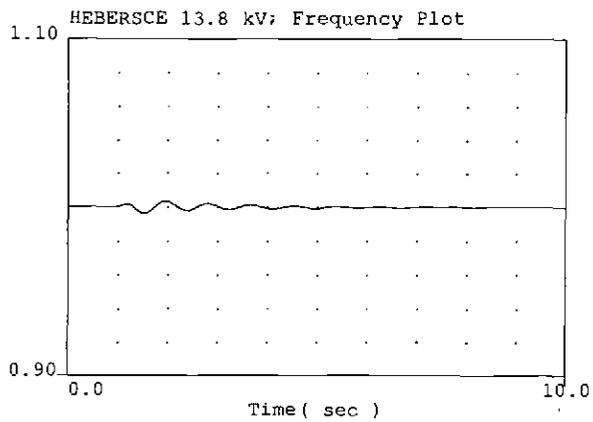
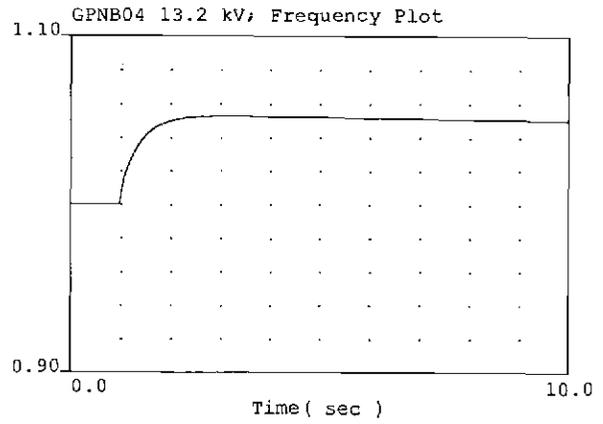
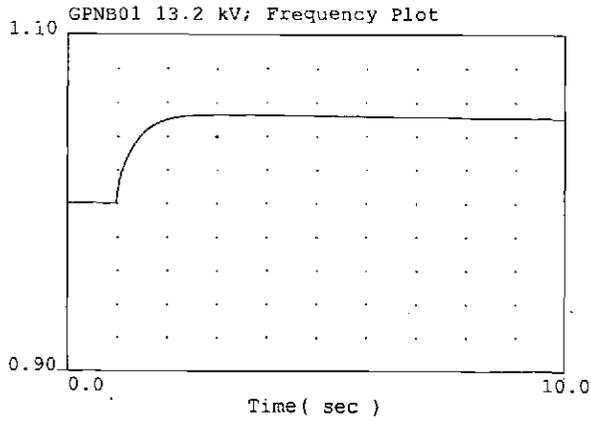
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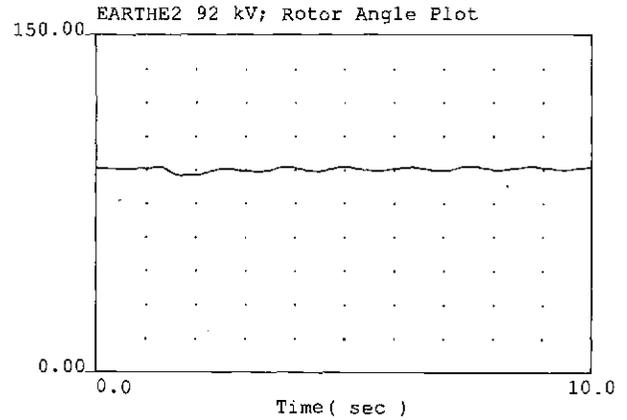
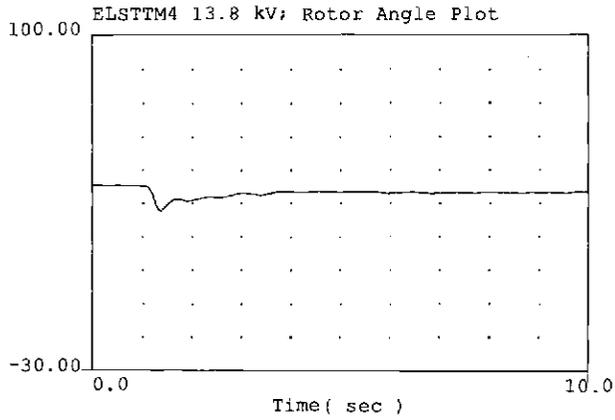
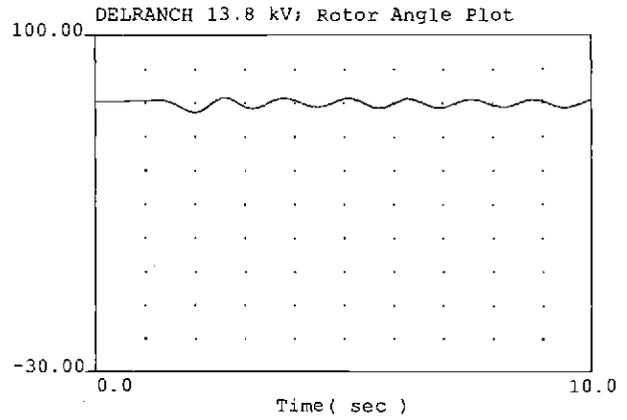
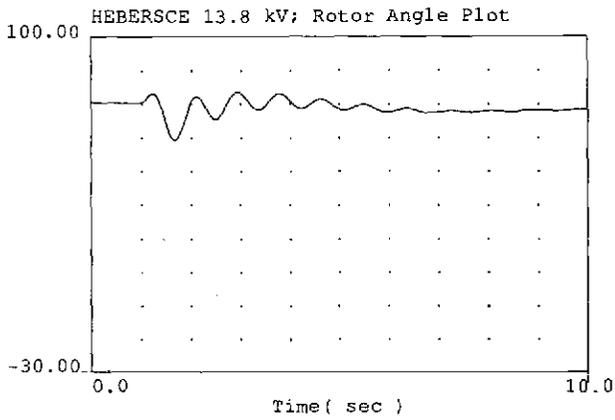
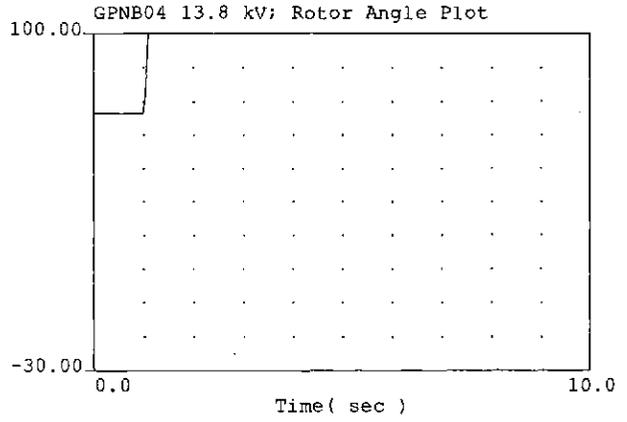
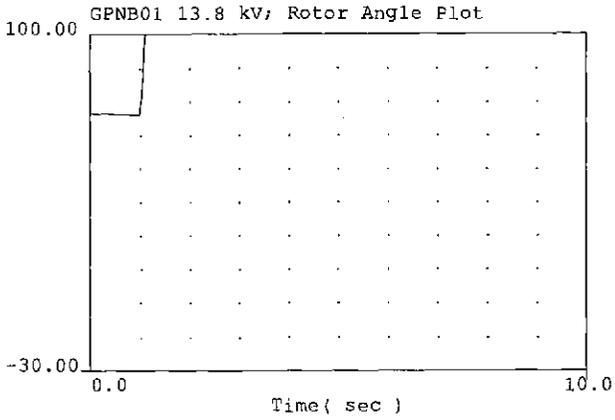
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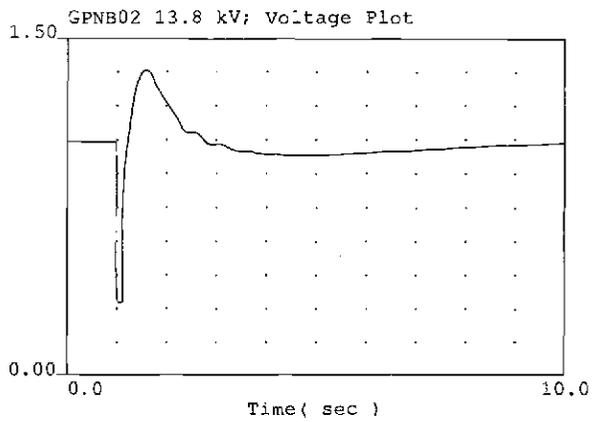
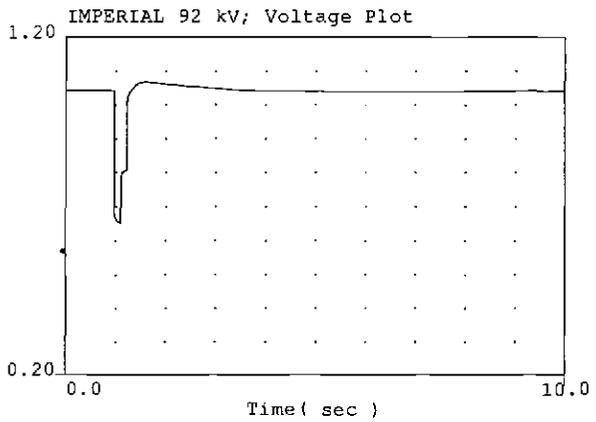
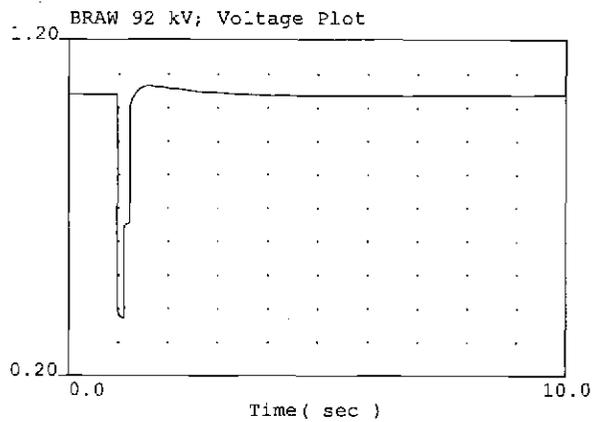
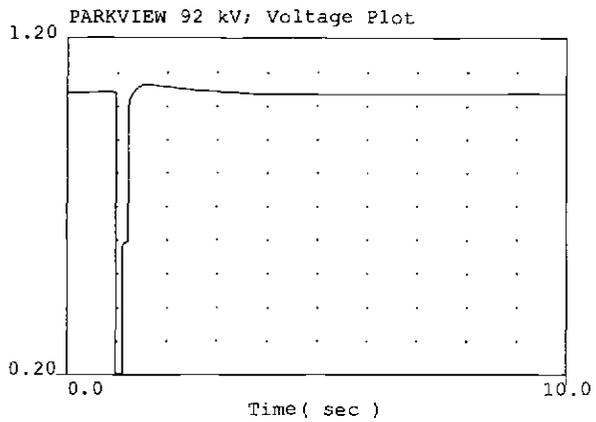
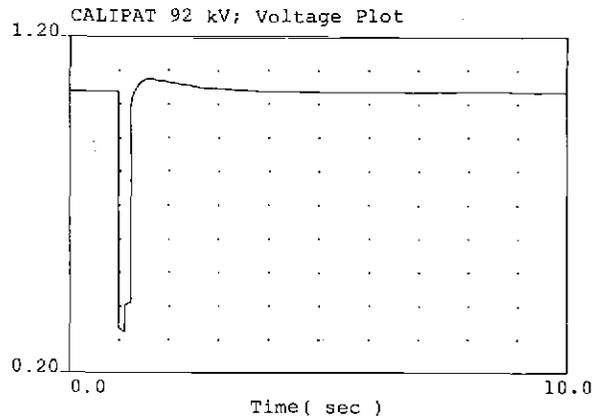
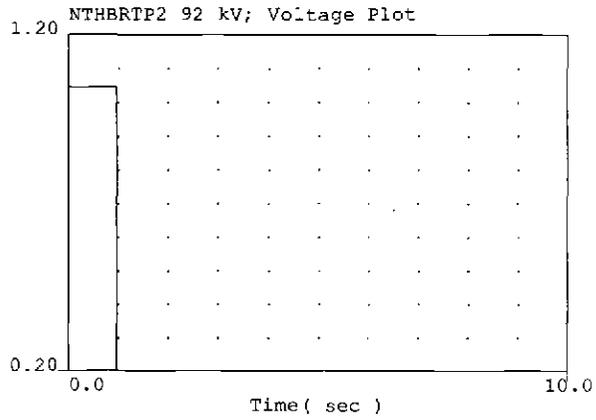
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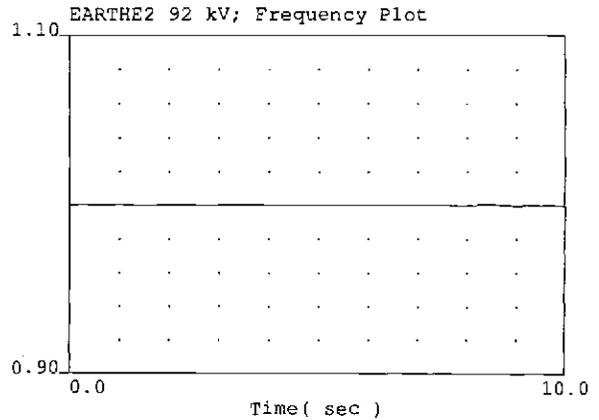
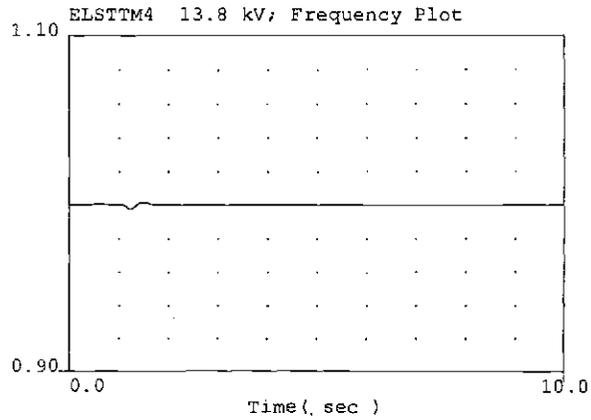
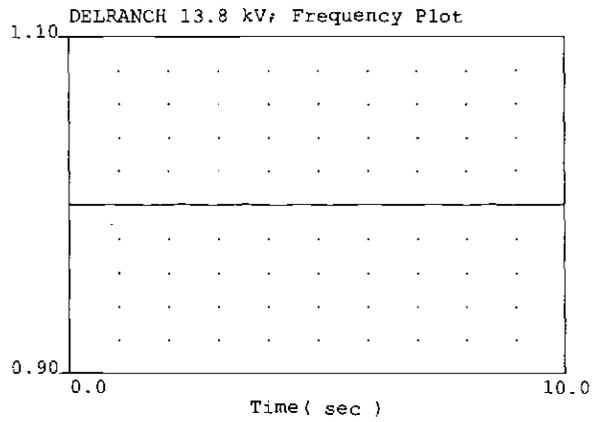
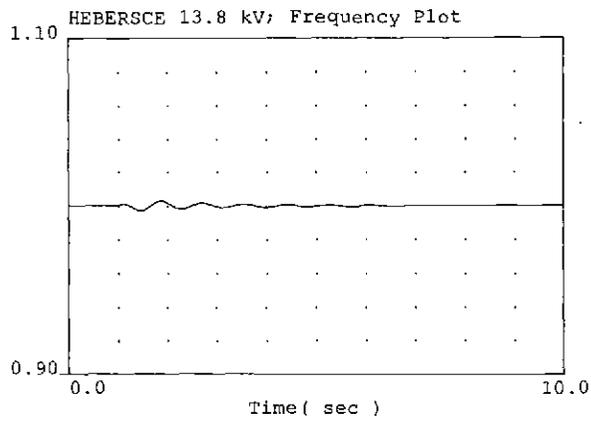
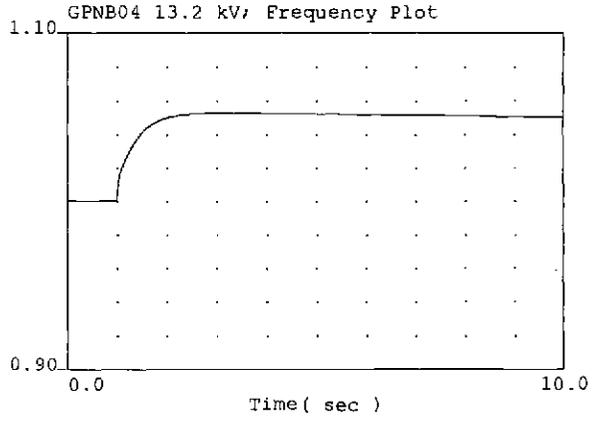
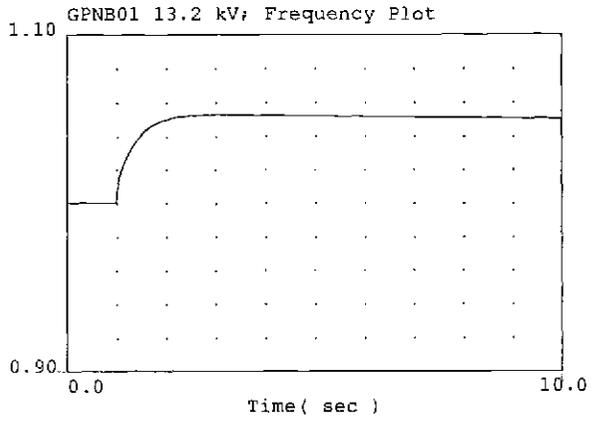
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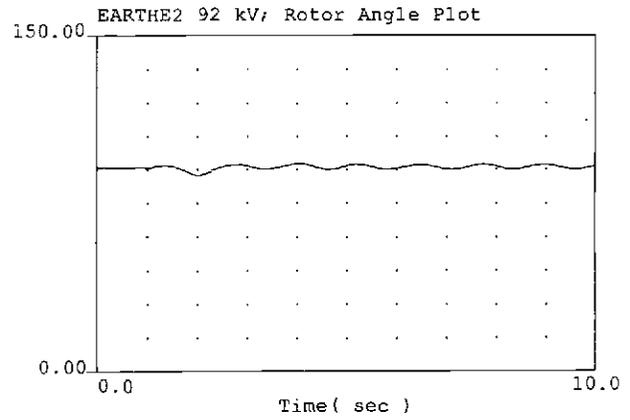
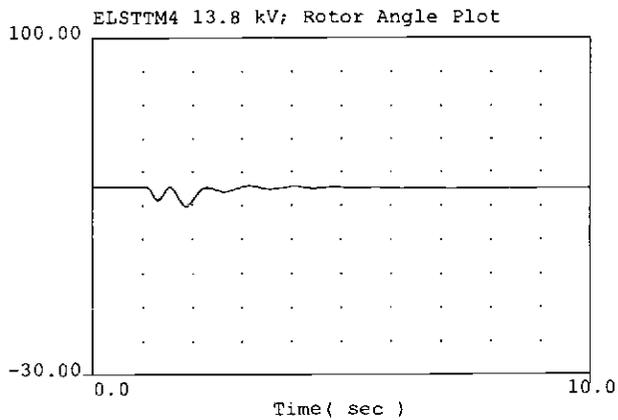
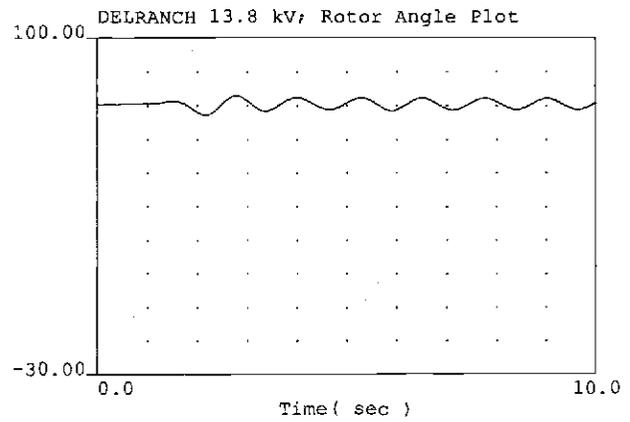
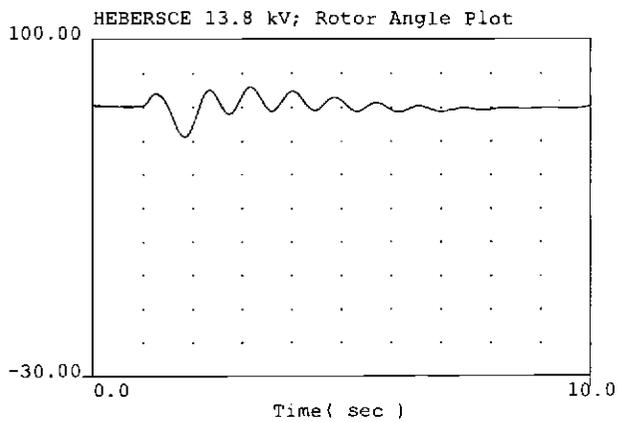
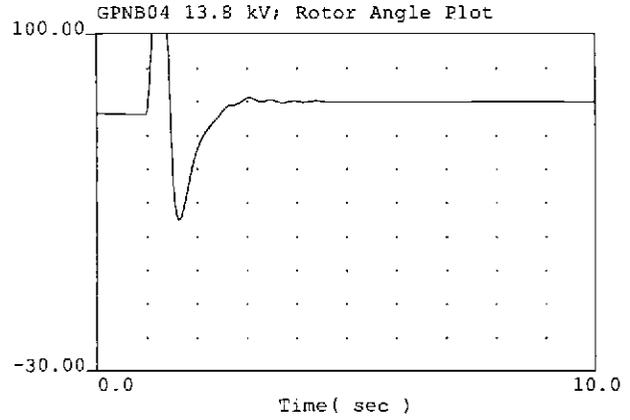
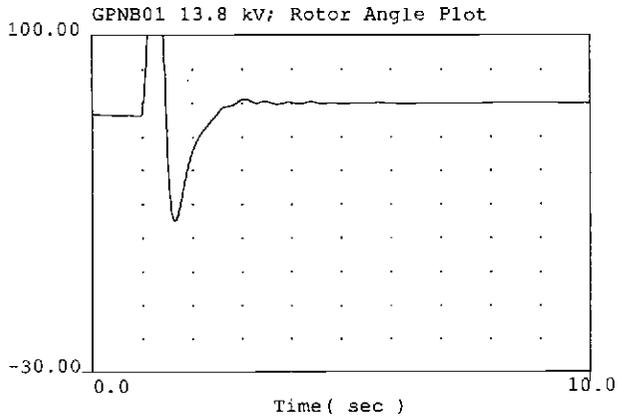
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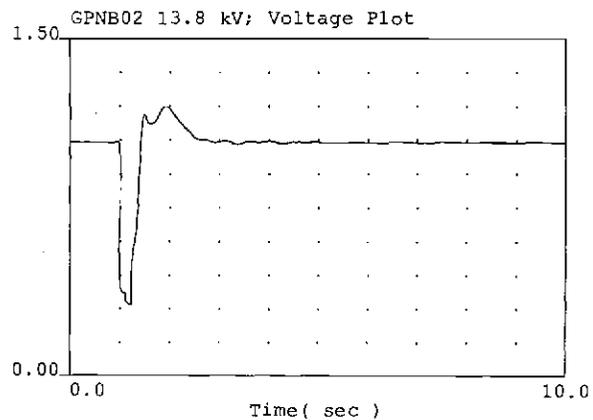
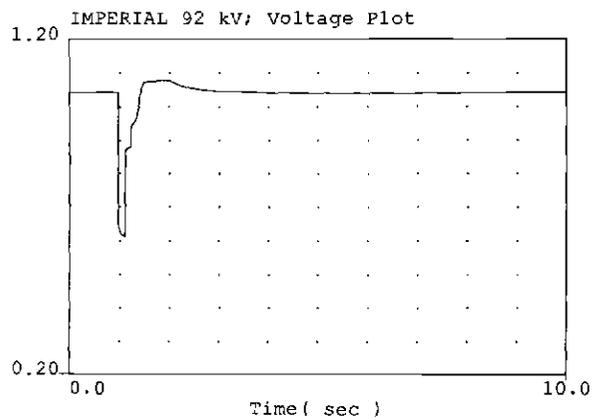
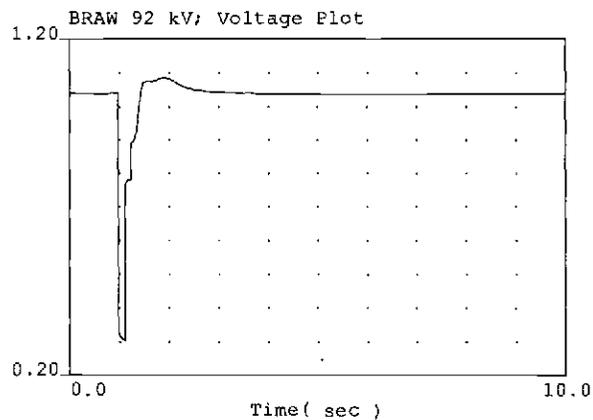
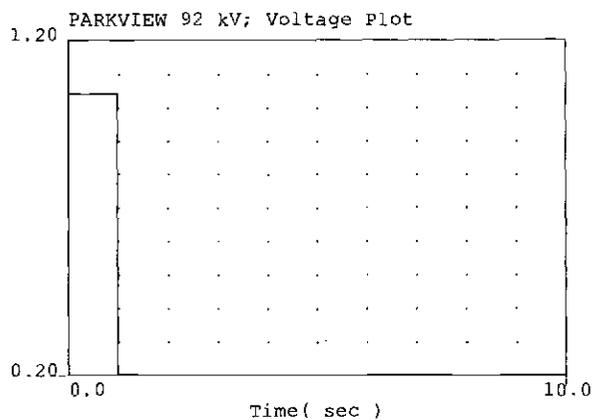
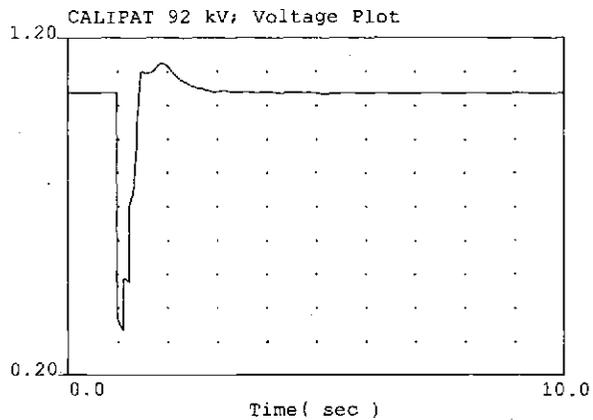
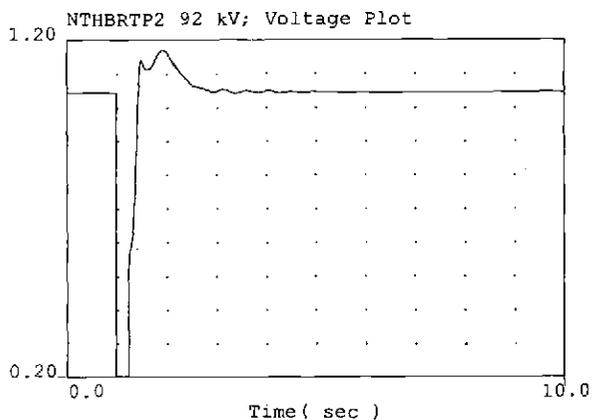
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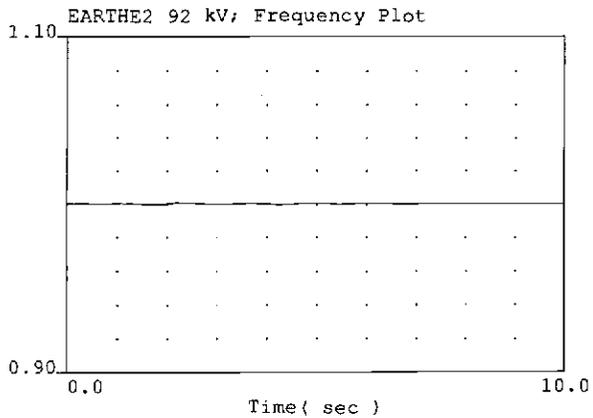
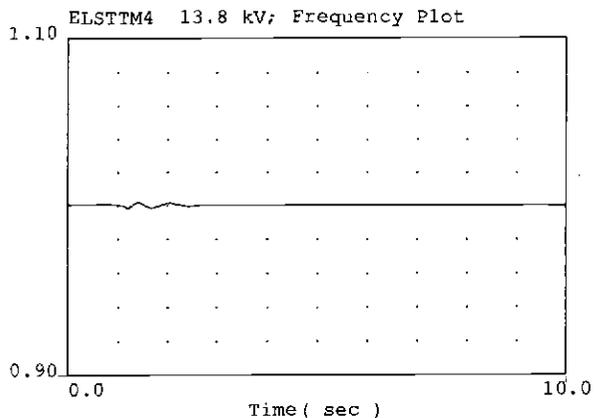
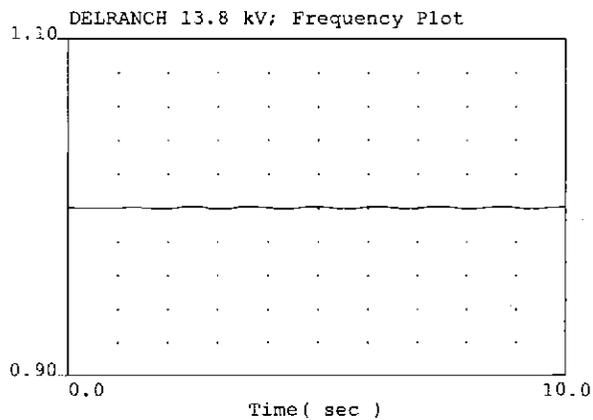
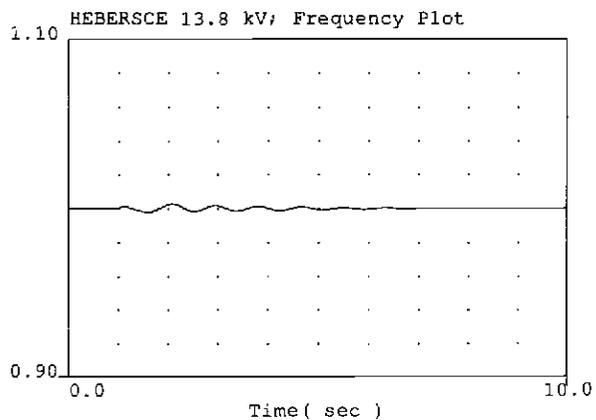
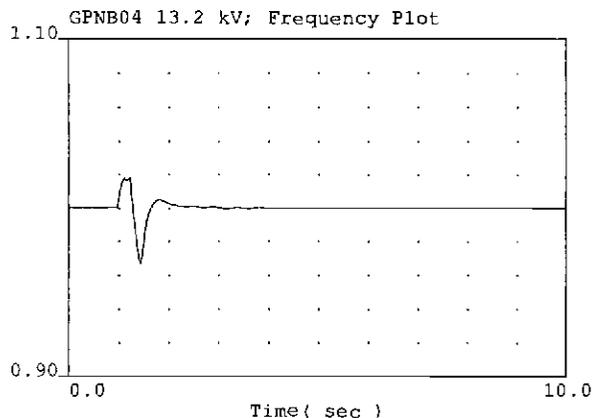
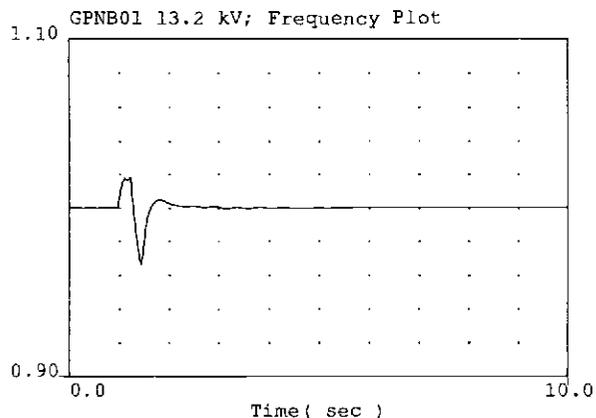
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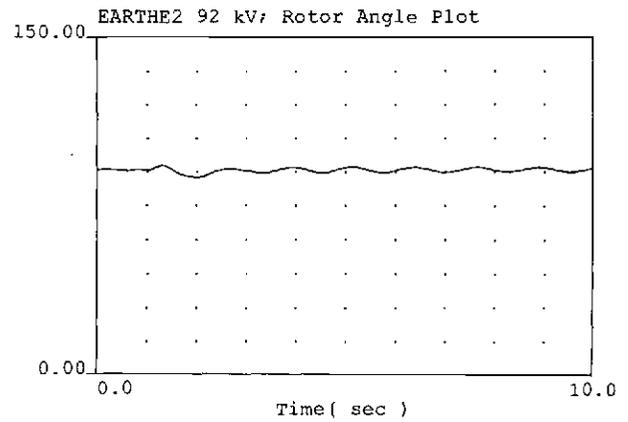
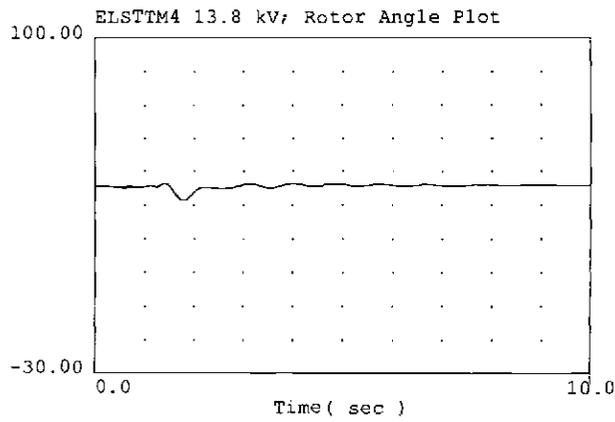
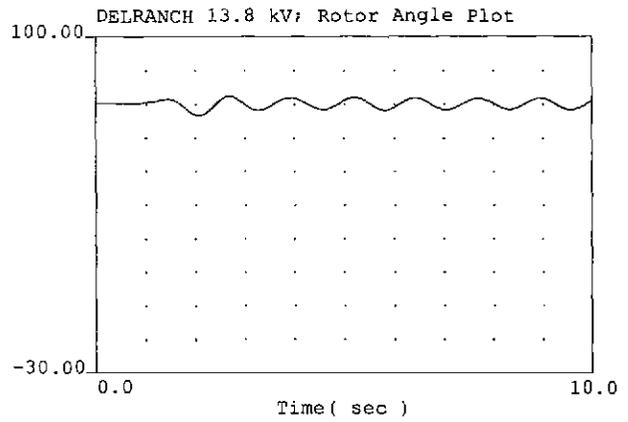
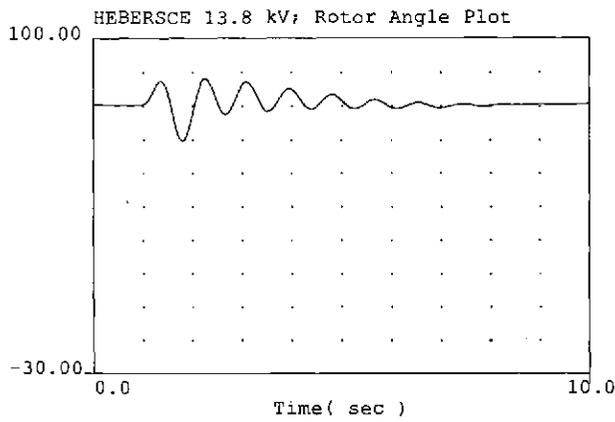
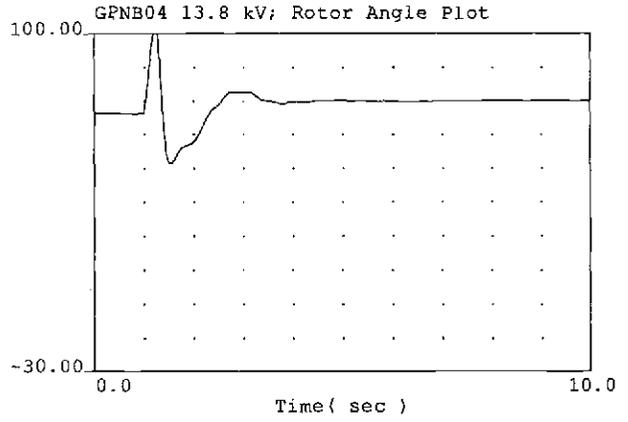
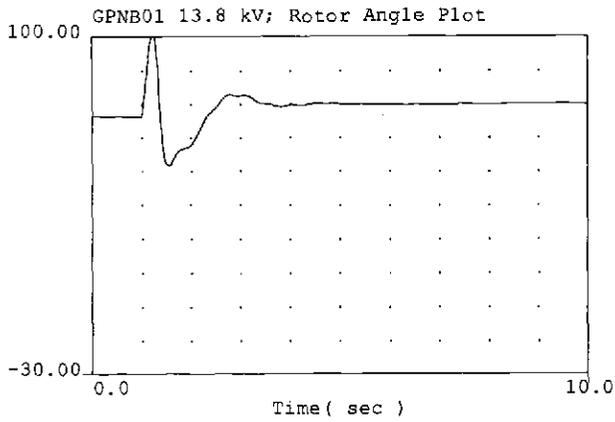
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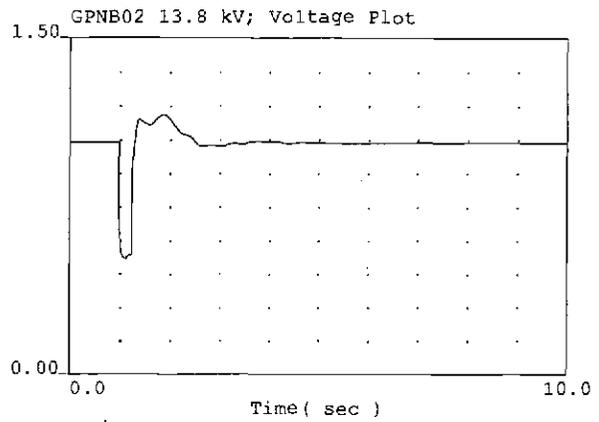
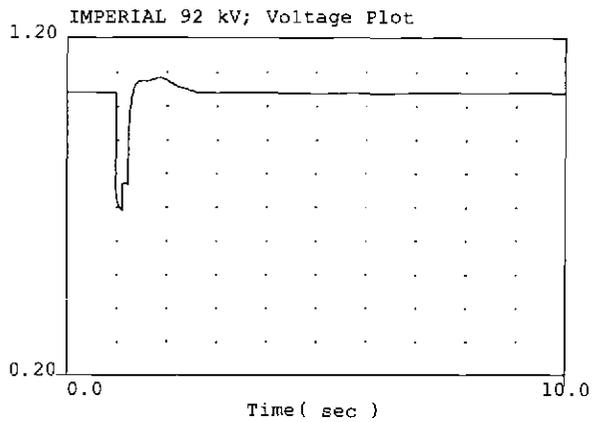
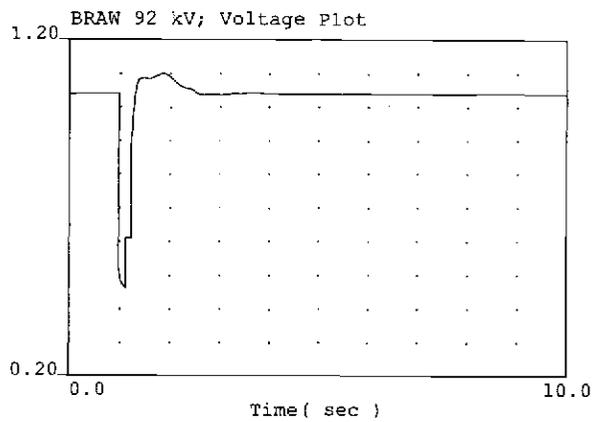
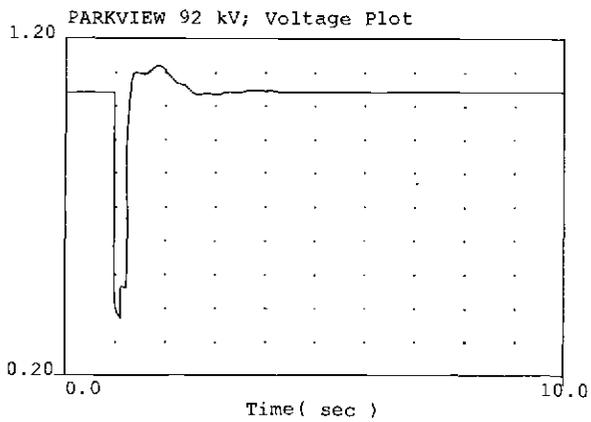
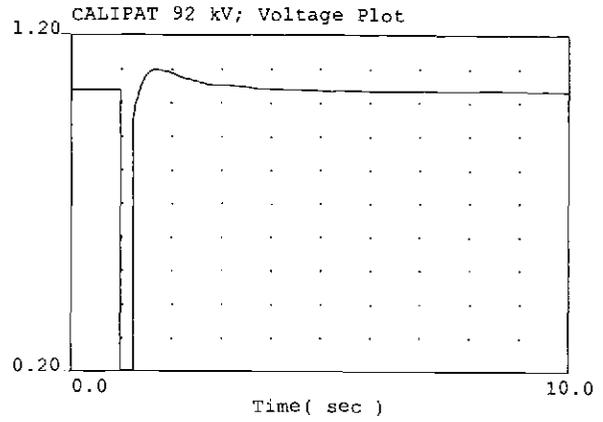
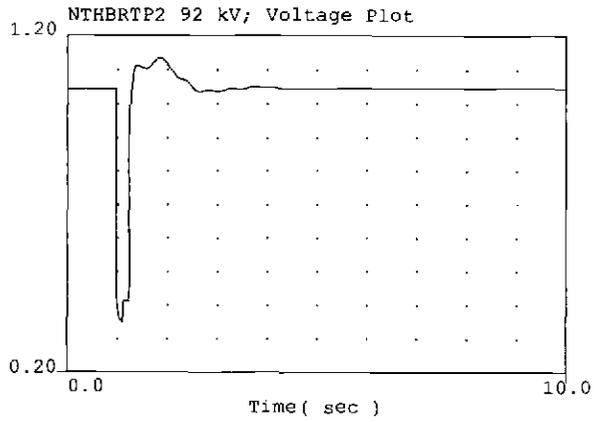
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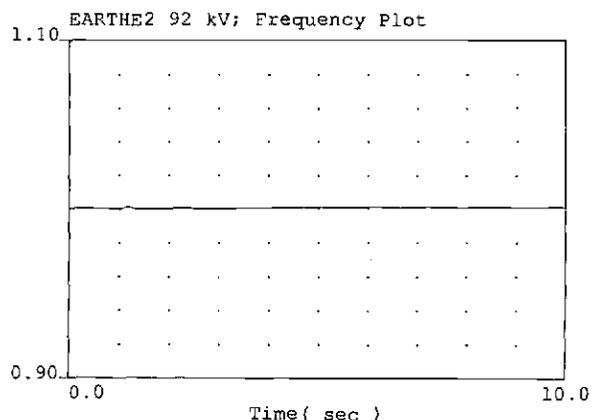
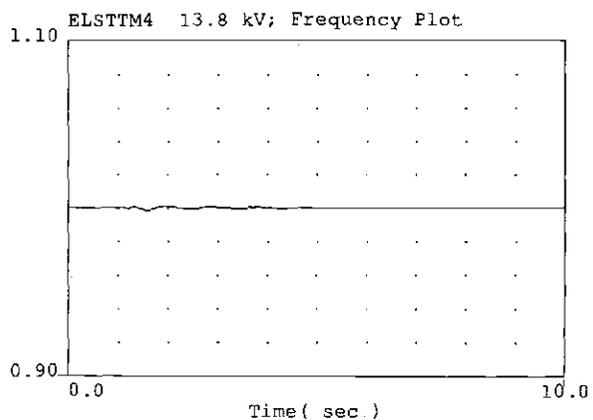
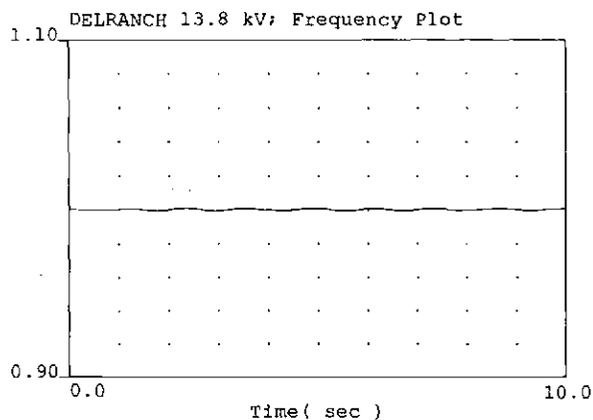
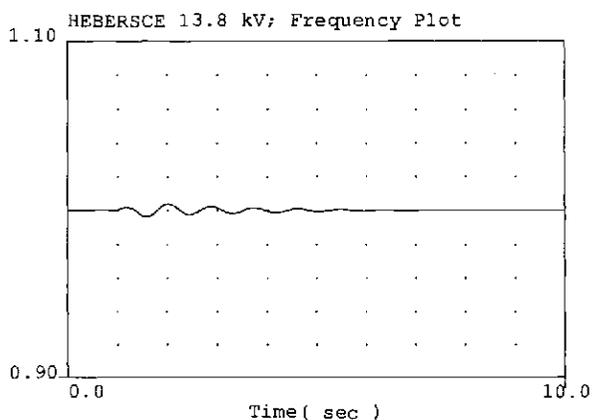
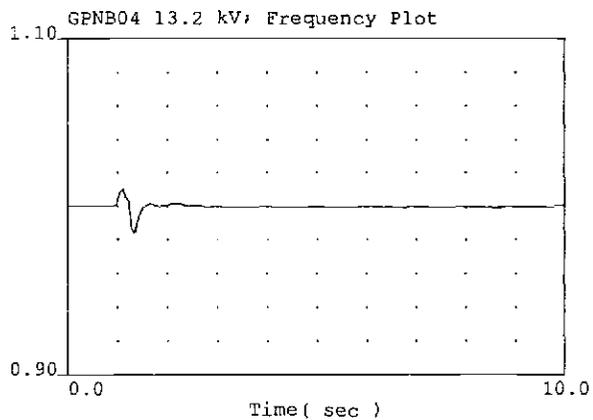
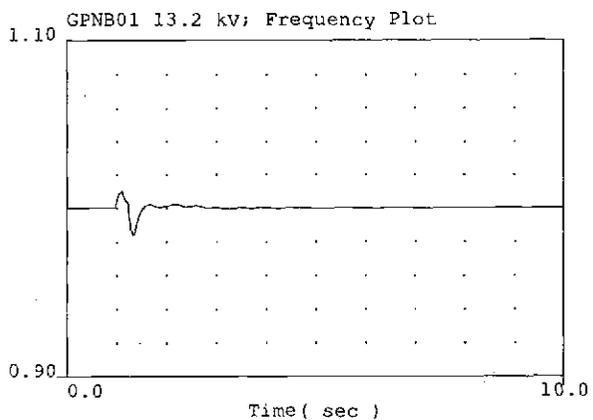
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**North Brawley
System Impact Study**



**Appendix F
Short Circuit Analysis**

REVISION 1

North Brawley Generation Project
System Impact Study (Revision 1)
Short Circuit Study & Breaker Capability Analysis



Executive Summary

A short circuit study and breaker capability analysis has been performed to determine the impact of the generation addition of the proposed North Brawley generation facility to the IID Energy transmission system. The analysis found minimal impacts to the interrupting capability of the IID Energy transmission system due to the addition of the North Brawley generation facility. The analysis also found that the fault duty at the Euclid 92kV substation will exceed the interrupting capability of two of the breakers, H40 and H50, at this substation (the pre-Project fault levels were at 99% of the interrupting capability while the post-Project fault level was found to be 101%), however IID Energy can accelerate a project to replace the affected equipment with sufficient interrupting capacity prior to the in-service date of the North Brawley project.

North Brawley Generation Project
System Impact Study (Revision 1)
Short Circuit Study & Breaker Capability Analysis



1.0 Introduction

A short circuit study and breaker capability analysis has been performed to determine the impact of the generation addition proposed with the North Brawley Generation Project. The purpose of the study is to determine if any interrupting rating violations of IID Energy electrical equipment will occur as a result of the generation addition.

2.0 Project Description

The North Brawley Generation Project includes the addition of twelve – 12.5MW generators interconnecting with the IID Energy system via a tap connection to the existing 92kV CALIP-PKVIEW line which currently interconnects the Calipatria and Parkview 92kV substations. The details on the split of the CALIP-PKVIEW line and the proposed project one line diagram have been provided in Attachment I.

2.1. Study Data

To perform the short circuit study, the generation addition was modeled in the IID Energy short circuit case using the ASPEN One-Liner software. The IID 2010 Base Case was utilized to model the generation addition.

Copies of the North Brawley impedance information that was provided to perform the study have been included in Attachment II. The following data was used to prepare the short circuit case:

92 kV Line Impedances (NB TAP is the Point of Interconnection with IID)

CALIPAT – NB TAP (approx 9.5 miles) $Z1=0.0147 + j0.0776$ pu
 $Z0=0.0441 + j0.2328$ pu

NB TAP – PARKVIEW (approx. 2.0 mi) $Z1=0.0031+j0.0163$ pu
 $Z0=0.0093+j0.0489$ pu

Note: An $Xo/X1$ ratio of 3 was used for the above line parameters.

Generator Step-up Transformers (3 modeled)

92/13.2kV (Y-Grounded/Delta)
 $X1 = 12.0\%$ on 37.0 MVA base
 $X0 = 10.7\%$ on 37.0 MVA base

Generator Step-up Transformers (1 modeled)

92/13.2kV (Y-Grounded/Delta)
 $X1 = 12.0\%$ on 55.0 MVA base
 $X0 = 10.7\%$ on 55.0 MVA base

North Brawley Generation Project
System Impact Study (Revision 1)
Short Circuit Study & Breaker Capability Analysis



Generators (each, total of 12 modeled)

Machine Base = 20.0 MVA (13.2KV)

X'' = 1.42 ohm (0.163 p.u.)

X' = 2.30 ohm (0.264 p.u.)

Neutral Resistor = 3.6 ohm

X = 17.9 ohm (2.055 p.u.)

X2 = 2.04 ohm (0.234 p.u.)

X0 = 0.94 ohm (0.108 p.u.)

3.0 Study Results

The short circuit study results indicate the following fault current levels at the proposed North Brawley generating facility and the neighboring Calipatria and Parkview substations. Additional fault levels for the pre-Project and post-Project are included in Attachment III.

Location	Fault Type	Pre-project	Post-project	% Change
Point of Interconnection at NB TAP	3 Phase	N/A	12,540 A	N/A
	Phase-Gnd	N/A	10,878 A	N/A
NB Switchyard	3 Phase	N/A	12,528 A	N/A
	Phase-Gnd	N/A	10,876 A	N/A
Calipatria	3 Phase	9,695 A	11,279 A	16.3%
	Phase-Gnd	6,765 A	7,873 A	16.3%
Parkview	3 Phase	9,003 A	12,285 A	36.5%
	Phase-Gnd	6,833 A	10,098 A	47.7%

The Thevenin Equivalent of the IID Energy system at the NB Switchyard 92kV bus is the following:

Z1 = 0.4463 + j4.2162 Ohms or Z1 = 0.0053 + j0.0498 p.u. (100 MVA base)

Z2 = 0.4956 + j4.4612 Ohms or Z2 = 0.0059 + j0.0527 p.u. (100 MVA base)

Z0 = 0.5056 + j5.9024 Ohms or Z0 = 0.0060 + j0.0697 p.u. (100 MVA base)

Impact of New Gen. on Regional Buses	Fault Type	Pre-project	Post-project	% Change
Imperial Valley	3 Phase	37,513 A	37,581 A	0.18%
	Phase-Gnd	35,877 A	35,915 A	0.11%
Blythe	3 Phase	29,532 A	29,540 A	0.03%
	Phase-Gnd	28,709 A	28,714 A	0.02%
Yucca	3 Phase	10,048A	10,053 A	0.05%
	Phase-Gnd	9,363 A	9,366 A	0.03%
Mirage	3 Phase	27,625 A	27,628 A	0.02%
	Phase-Gnd	19,607 A	19,608 A	0.01%

North Brawley Generation Project
System Impact Study (Revision 1)
Short Circuit Study & Breaker Capability Analysis



4.0 Conclusion

The above results indicate that there is minimal impact on the short circuit levels of the IID Energy electrical grid and neighboring utility interconnections due to the North Brawley generation addition. The highest percentage of incremental fault duty was found at the IID Calipatria and Parkview substations; however the fault duty at these locations is still well below the interrupting capability of the rating of the breakers at these locations.

The analysis also found that the fault duty at the Euclid 92kV substation will exceed the interrupting capability of two of the breakers, H40 and H50, at this substation (the pre-Project fault levels were at 99% of the interrupting capability while the post-Project fault level was found to be 101%), however IID Energy can accelerate a project to replace the affected equipment with sufficient interrupting capacity prior to the in-service date of the North Brawley project.

**North Brawley
System Impact Study**



**Appendix G
Sensitivity Short Circuit Analysis**

REVISION 1

North Brawley Generation Project – SIS (REVISION 1)
Short Circuit Study & Breaker Capability Analysis
Sensitivity Analysis with Six North Brawley Units (vs. Twelve)



Executive Summary

A sensitivity to the original short circuit study and breaker capability analysis has been performed to determine the impact of the first six units of the proposed generation addition of North Brawley facility to the IID Energy transmission system. The analysis found minimal impacts to the interrupting capability of the IID Energy transmission system due to the addition of the North Brawley generation facility. The analysis also found that the fault duty at the Euclid 92kV substation will exceed the interrupting capability of two of the breakers, H40 and H50, at this substation (the pre-Project fault levels were at 99% of the interrupting capability while the post-Project fault level was found to be 100.04%), however IID Energy can accelerate a project to replace the affected equipment with sufficient interrupting capacity prior to the in-service date of the North Brawley project.

North Brawley Generation Project – SIS (REVISION 1)
Short Circuit Study & Breaker Capability Analysis
Sensitivity Analysis with Six North Brawley Units (vs. Twelve)



1.0 Introduction

A sensitivity short circuit study and breaker capability analysis has been performed to determine the impact of the generation addition proposed with the North Brawley Generation Project. The purpose of the study is to determine if any interrupting rating violations of IID Energy electrical equipment will occur as a result of the initial phase of six generating units at the North Brawley Generation Project.

2.0 Project Description

The North Brawley Generation Project includes the addition of six (6) – 12.5MW generators interconnecting with the IID Energy system via a tap connection to the existing 92kV CALIP-PKVIEW line which currently interconnects the Calipatria and Parkview 92kV substations.

2.1. Study Data

To perform the short circuit study, the generation addition was modeled in the IID Energy short circuit case using the ASPEN One-Liner software. The IID 2010 Base Case was utilized to model the generation addition.

92 kV Line Impedances (NB TAP is the Point of Interconnection with IID)

CALIPAT – NB TAP (approx 9.5 miles) $Z1=0.0147 + j0.0776$ pu
 $Z0=0.0441 + j0.2328$ pu

NB TAP – PARKVIEW (approx. 2.0 mi) $Z1=0.0031+j0.0163$ pu
 $Z0=0.0093+j0.0489$ pu

Note: An X_0/X_1 ratio of 3 was used for the above line parameters.

Generator Step-up Transformers (2 modeled)

92/13.2kV (Y-Grounded/Delta)
 $X1 = 12.0\%$ on 37.0 MVA base
 $X0 = 10.7\%$ on 37.0 MVA base

Generators (each, total of 6 modeled)

Machine Base = 20.0 MVA (13.2KV)
 $X'' = 1.42$ ohm (0.163 p.u.) $X = 17.9$ ohm (2.055 p.u.)
 $X' = 2.30$ ohm (0.264 p.u.) $X2 = 2.04$ ohm (0.234 p.u.)
Neutral Resistor = 3.6 ohm $X0 = 0.94$ ohm (0.108 p.u.)

North Brawley Generation Project – SIS (REVISION 1)
 Short Circuit Study & Breaker Capability Analysis
 Sensitivity Analysis with Six North Brawley Units (vs. Twelve)



3.0 Study Results

The short circuit study results indicate the following fault current levels at the proposed North Brawley generating facility and the neighboring Calipatria and Parkview substations. Fault levels have also been included for the El Centro and Euclid 92kV substations. The table identifies the Pre-Project, Post-Project with six units, and Post-Project with twelve units at the North Brawley Generation Project.

Location	Fault Type	Pre-project	Post-project Six Units	Post-Project Twelve Units	% Change
Point of Interconnection at NB TAP	3 Phase	N/A	10,347 A	12,540 A	N/A
	Phase-Gnd	N/A	8,427 A	10,878 A	N/A
NB Switchyard	3 Phase	N/A	10,334 A	12,528 A	N/A
	Phase-Gnd	N/A	8,413 A	10,876 A	N/A
Calipatria	3 Phase	9,695 A	10,548 A	11,279 A	16.3%
	Phase-Gnd	6,765 A	7,409 A	7,873 A	16.3%
Parkview	3 Phase	9,003 A	10,639 A	12,285 A	36.5%
	Phase-Gnd	6,833 A	8,549 A	10,098 A	47.7%
El Centro 92kV	3 Phase	32,936 A	33,568 A	34,047 A	3.4%
	Phase-Gnd	38,351 A	38,886 A	39,293 A	2.5%
Euclid 92kV	3 Phase	19,788 A	20,008 A	20,172 A	1.9%
	Phase-Gnd	15,777 A	15,864 A	15,929 A	.9%

The Thevenin Equivalent of the IID Energy system at the NB Switchyard 92kV bus is the following:

$$\begin{aligned}
 Z1 &= 0.6448 + j5.0995 \text{ Ohms} & \text{or} & & Z1 &= 0.0076 + j0.0602 \text{ p.u. (100 MVA base)} \\
 Z2 &= 0.6831 + j5.2565 \text{ Ohms} & \text{or} & & Z2 &= 0.0081 + j0.0321 \text{ p.u. (100 MVA base)} \\
 Z0 &= 0.9013 + j8.4525 \text{ Ohms} & \text{or} & & Z0 &= 0.0106 + j0.0999 \text{ p.u. (100 MVA base)}
 \end{aligned}$$

North Brawley Generation Project – SIS (REVISION 1)
Short Circuit Study & Breaker Capability Analysis
Sensitivity Analysis with Six North Brawley Units (vs. Twelve)



4.0 Conclusion

The above results indicate that there is minimal impact on the short circuit levels of the IID Energy electrical grid and neighboring utility interconnections due to the North Brawley generation addition. The highest percentage of incremental fault duty was found at the IID Calipatria and Parkview substations; however the fault duty at these locations is still well below the interrupting capability of the rating of the breakers at these locations.

The analysis also found that the fault duty at the Euclid 92kV substation will exceed the interrupting capability of two of the breakers, H40 and H50, at this substation (the pre-Project fault levels were at 99% of the interrupting capability while the post-Project fault level was found to be 100.04%), however IID Energy can accelerate a project to replace the affected equipment with sufficient interrupting capacity prior to the in-service date of the North Brawley project.

**North Brawley
System Impact Study**



**Appendix H
Post-Transient Stability Analysis**

EXECUTIVE SUMMARY

Imperial Irrigation District (IID) has contracted PDS consulting, PLC (PDS) to perform a post-transient power flow analysis including reactive power margin test for the integration of the North Brawley Generation Project to the IID energy system. The scope of the post-transient analysis is to determine the impact caused solely by the addition the North Brawley generation project to the IID Energy transmission system during the post-transient time frame.

The post-transient analysis showed that there were several bus voltage deviation violations per WECC/NERC planning standards. However, the violations were existing violations and were not caused by the addition of the North Brawley project.

The addition of the North Brawley project caused the existing reactive power margins at five (5) of the ten (10) buses monitored to decrease up to 4 Mvar following the outage of the Imperial Valley-Miguel 500 kV line. However, the post-transient reactive power margin analysis indicated positive reactive power margins at all the critical buses monitored.

INTRODUCTION

Imperial Irrigation District (IID) has contracted PDS consulting, PLC (PDS) to perform a post-transient power flow analysis including reactive power margin test for the integration of the North Brawley Generation Project to the IID energy system. The scope of the post-transient analysis is to determine the impact caused solely by the addition the North Brawley generation project to the IID Energy transmission system during the post-transient time frame.

Post-transient Power Flow Analysis

Post-transient power flow analysis was performed on both the pre-project and post-project base cases for the 2010 heavy summer and 2010 light winter operating conditions. The two base cases were used to simulate the impact of the North Brawley Project during single (N-1) as well as multiple contingencies. The N-1 and selected multiple contingencies simulated included:

- All single (92-230 kV) transmission circuit outages within the vicinity of the project
- All single transformer outages within the vicinity of the project
- Selected outages of double circuit tower lines (92-230 kV) within the vicinity of the project.

The contingency lists for the post-transient analysis can be found in Appendix C.

The WECC/NERC standard was used to assess the adequacy of the study results. The post-transient analysis related evaluation criteria used are:

- Maximum voltage deviations allowed at all buses in the post-transient time frame will be 5% for N-1 and 10% for N-2 unless a lower standard has been previously adopted on selected buses. Southern California Edison (SCE) allows a lower standard of 7% post-transient voltage deviation for N-1 contingencies. Table 1 also provides a summary of the WECC/NERC post-transient deviation standard.

Post-transient Reactive Power Margin

Post-transient reactive power margin analysis was performed on selected buses in the IID transmission system following selected critical outages. This analysis was performed using the 2010 pre- and post-project base cases. The list outages simulated and the buses monitored are provided below.

- N. Laquinta-Avenue 92 kV line outage
 - Imperial Valley-Miguel 500 kV line outage
 - Palo Verde-Devers 500 kV line outage
-

- N. Gila-Imperial Valley 500 kV line outage
- Imperial Valley-Elcentro 230 kV line outage
- ELSTM2 and REPU2 generator outages

The monitored buses included:

- Avenue 58 161 kV
- Coachella Valley 161 kV
- N. Laquinta 92 kV
- Coachella Valley 92 kV
- Midway 92 kV
- Niland 92 kV
- Elcentro 92 kV
- Calexico 92 kV
- Pilot Knob 92 kV
- Dixieland 92 kV

The post-transient reactive power margin analysis evaluated criteria used are:

- Minimum reactive power margin at any bus following N-1 outage is 100 Mvar
- Minimum reactive power margin at any bus following N-2 outage is 50 Mvar.

NERC and WECC Categories	Outage Frequency Associated with the Performance Category (outage/year)	Transient Voltage Dip Standard	Minimum Transient Frequency Standard	Post Transient Voltage Deviation Standard
A System normal	Not Applicable	Nothing in addition to NERC		
B One element out-of-service	≥ 0.33	Not to exceed 25% at load buses or 30% at non-load buses. Not to exceed 20% for more than 20 cycles at load buses.	Not below 59.6Hz for 6 cycles or more at a load bus.	Not to exceed 5% at any bus.
C Two or more elements out-of-service	0.033 – 0.33	Not to exceed 30% at any bus. Not to exceed 20% for more than 40 cycles at load buses.	Not below 59.0Hz for 6 cycles or more at a load bus.	Not to exceed 10% at any bus.
D Extreme multiple-element outages	< 0.033	Nothing in addition to NERC		

Table 1: WECC/NERC Post-Transient and Stability Analysis Evaluation Criteria

POST TRANSIENT POWER FLOW STUDY RESULTS

Post-transient power flow solutions were achieved for most of the outages studied using both the 2010 heavy summer and 2010 light winter base cases. Two multiple outages however did not result in post-transient solution using both the 2010 heavy summer and 2010 light winter pre- and post-project base cases. These outages are:

- Coachella-Devers and Coachella-Indian Hills 230 kV lines (without RAS)
- Ramon-Mirage and Coachella-Devers 230 kV lines (without RAS)

Post-transient power flow solutions were however achieved by implementing the RAS associated with the above outages. In particular, to achieve a post-transient power flow solution following the simultaneous outages of Coachella-Devers and Coachella-Indian Hills 230 kV lines, about 120 MW of generation were tripped at generation collector systems connected to Midway 92 kV substation.

Several bus voltage deviation violations were recorded following selected N-1 outages using the 2010 heavy summer pre- and post-project base cases. However, the bus voltage deviation violations recorded were not due to the addition of the North Brawley Project.

The following sections provide details of the post-transient power flow findings for each of the operating condition evaluated.

2010 Heavy Summer Base Case

A summary of the post-transient power flow study results is provided in Appendix A. Key post-transient power flow findings from the studies performed using the 2010 heavy summer base case are:

- Post-transient power flow solutions were obtained for all the N-1 outages simulated using both the pre- and post-project base cases.
 - Several bus voltage deviation violations were recorded following selected N-1 outages during the 2010 heavy summer operating condition. The bus voltage deviation violations recorded were however not due to the addition of the North Brawley Project.
 - Coachella-Devers and Coachella-Indian Hills 230 kV lines (without RAS) did not result in post-transient power flow solution using both pre- and post-project base cases. Post-transient solution was obtained by tripping up to 120 MW of generation connected to the Midway 92 kV substation collector systems following the outages.
 - Coachella-Devers and Ramon-Mirage 230 kV lines (without RAS) did not result in post-transient power flow solution using both pre- and post-project base cases. Post-transient solution was obtained by the implementation of the Path 42 RAS.
 - No post-transient bus voltage deviation violations were recorded following any of the multiple outages simulated.
-

2010 Light Winter Base Case

Post-transient power flow solutions were obtained for all the N-1 outages. Two multiple outages did not result in post-transient power flow solution without RAS. Solutions were obtained with implementation of the RAS associated with the outages.

No bus voltage deviation violation was recorded for all the outages studied using the 2010 light autumn base case.

POST-TRANSIENT REACTIVE POWER MARGIN STUDY RESULTS

A summary of the post-transient reactive power margin analysis can be found at Appendix B. Positive reactive power margins were obtained at all the buses monitored following the selected outages.

The addition of the North Brawley Project did not impact the existing reactive power margins at the selected buses for all the outages with the exception of the Imperial Valley – Miguel 500 kV line outage. An outage of the Imperial Valley-Miguel 500 kV line caused the reactive power margin at five (5) buses to decrease up to 4 MVar. In particular, the addition of the North Brawley Project and the subsequent outage of the Imperial Valley – Miguel 500 kV line caused the reactive power margin at N. LAQUITA 92 kV bus to decrease from 103 Mvar to 99 MVar.

Summary of 2010 Heavy Summer Post-transient Power Flow Analysis

Bus	Name	kV	Area	Outage	Pre-Project Bus Voltage Deviation	Post-Project Bus Voltage Deviation	Outage description	Comment
8292	N.LAQUIN	92	8	line_17	-6.2%	-6.2%	Line N.LAQUIN 92.0 to AVE42 92.0 Circuit 1	Bus voltage deviation violations not due to addition of the project
8286	LAQUINTA	92	8	line_17	-6.0%	-6.0%	Line N.LAQUIN 92.0 to AVE42 92.0 Circuit 1	
8354	MARSHALL	92	8	line_17	-5.0%	-5.1%	Line N.LAQUIN 92.0 to AVE42 92.0 Circuit 1	
8699	MIDWAY	230	8	line_29	-5.0%	-5.1%	Line COACHELA 230.0 to MIDWAY 230.0 Circuit 1	
8699	MIDWAY	230	8	line_30	-5.0%	-5.1%	Line COACHELA 230.0 to MIDWAY 230.0 Circuit 2	
19112	N.GILA	161	14	line_206	-8.3%	-7.4%	line HASSYAMP to N.GILA 500 ck 1	
19020	BLYTHE	161	14	line_206	-7.9%	-6.0%	line HASSYAMP to N.GILA 500 ck 1	
19046	BOUSE	161	14	line_206	-8.2%	-7.0%	line HASSYAMP to N.GILA 500 ck 1	
19049	GILA	69	14	line_206	-5.4%	-4.8%	line HASSYAMP to N.GILA 500 ck 1	
19050	GILA	161	14	line_206	-8.2%	-7.3%	line HASSYAMP to N.GILA 500 ck 1	
19051	KNOB	161	14	line_206	-7.3%	-6.3%	line HASSYAMP to N.GILA 500 ck 1	
19063	WLTNMOHK	161	14	line_206	-8.7%	-7.7%	line HASSYAMP to N.GILA 500 ck 1	
19070	DOME TAP	161	14	line_206	-8.9%	-7.8%	line HASSYAMP to N.GILA 500 ck 1	
84826	ARABY S	69	14	line_206	-5.1%	-4.5%	line HASSYAMP to N.GILA 500 ck 1	
84837	ARABYTAP	69	14	line_206	-5.1%	-4.5%	line HASSYAMP to N.GILA 500 ck 1	
84894	ARABY N	69	14	line_206	-5.1%	-4.5%	line HASSYAMP to N.GILA 500 ck 1	
84895	AR FH TP	69	14	line_206	-5.1%	-4.5%	line HASSYAMP to N.GILA 500 ck 1	
19105	GLT TAP	161	14	line_206	-9.2%	-7.7%	line HASSYAMP to N.GILA 500 ck 1	
19100	KOFA	161	14	line_206	-8.4%	-7.2%	line HASSYAMP to N.GILA 500 ck 1	
19101	BUCKBLVD	161	14	line_206	-7.9%	-6.0%	line HASSYAMP to N.GILA 500 ck 1	
19601	BOUSE AZ	161	14	line_206	-8.2%	-7.0%	line HASSYAMP to N.GILA 500 ck 1	
19603	BLYTHEAZ	161	14	line_206	-7.9%	-6.0%	line HASSYAMP to N.GILA 500 ck 1	
19604	GILA AZ	69	14	line_206	-5.4%	-4.8%	line HASSYAMP to N.GILA 500 ck 1	
22004	ALPINE	69	22	line_207	-8.9%	-9.0%	line IMPRLVLY to MIGUEL 500 ck 1	
22008	ASH	69	22	line_207	-5.4%	-5.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22012	ASH TP	69	22	line_207	-5.5%	-5.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22016	AVCADOTP	69	22	line_207	-5.1%	-5.1%	line IMPRLVLY to MIGUEL 500 ck 1	
22020	AVOCADO	69	22	line_207	-5.1%	-5.1%	line IMPRLVLY to MIGUEL 500 ck 1	
22024	B	69	22	line_207	-9.5%	-9.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22028	B TP	69	22	line_207	-9.6%	-9.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22040	BARRETT	69	22	line_207	-8.2%	-8.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22044	BARRETTTP	69	22	line_207	-8.6%	-8.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22048	BATIQTOS	138	22	line_207	-5.9%	-5.9%	line IMPRLVLY to MIGUEL 500 ck 1	
22052	BATIQTTP	138	22	line_207	-5.9%	-5.9%	line IMPRLVLY to MIGUEL 500 ck 1	

Summary of 2010 Heavy Summer Post-transient Power Flow Analysis (Continued)

Bus	Name	kV	Area	Outage	Pre-Project Bus Voltage Deviation	Post-Project Bus Voltage Deviation	Outage description	Comment
22056	BERNARDO	69	22	line_207	-6.6%	-6.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22060	BERNDOTP	69	22	line_207	-6.6%	-6.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22064	BLDCRKT	69	22	line_207	-8.2%	-8.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22068	BOLDCRCK	69	22	line_207	-8.2%	-8.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22072	BOLVRDTP	69	22	line_207	-7.1%	-7.1%	line IMPRLVLY to MIGUEL 500 ck 1	
22076	BORDER	69	22	line_207	-7.3%	-7.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22080	BORDERTP	69	22	line_207	-7.8%	-7.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22084	BORREGO	69	22	line_207	-8.6%	-8.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22088	BOULEVRD	69	22	line_207	-6.3%	-6.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22092	CABRILLO	69	22	line_207	-8.7%	-8.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22096	CABRLNVY	69	22	line_207	-8.7%	-8.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22100	CALAVRTP	138	22	line_207	-5.6%	-5.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22104	CAMERON	69	22	line_207	-7.5%	-7.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22108	CANNON	138	22	line_207	-5.6%	-5.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22116	CARLHTHP	138	22	line_207	-7.8%	-7.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22120	CARLTNHS	138	22	line_207	-7.8%	-7.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22124	CHCARITA	138	22	line_207	-6.7%	-6.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22132	CHOLLAS	69	22	line_207	-9.6%	-9.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22136	CLAIRMNT	69	22	line_207	-8.2%	-8.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22140	CLARMTTP	69	22	line_207	-8.2%	-8.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22144	CORONADO	69	22	line_207	-9.6%	-9.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22906	CALPK_BD	69	22	line_207	-7.3%	-7.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22151	CALPK_EC	69	22	line_207	-9.0%	-9.1%	line IMPRLVLY to MIGUEL 500 ck 1	
22910	CALPK_ES	69	22	line_207	-5.1%	-5.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22152	CREELMAN	69	22	line_207	-8.7%	-8.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22160	DEL MAR	69	22	line_207	-7.3%	-7.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22164	DELMARTP	69	22	line_207	-7.3%	-7.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22168	DESCANSO	69	22	line_207	-8.2%	-8.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22172	DIVISION	69	22	line_207	-9.6%	-9.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22180	DOUBLET	69	22	line_207	-7.4%	-7.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22184	DOUBLET	138	22	line_207	-6.7%	-6.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22188	DOUBLTTP	69	22	line_207	-7.4%	-7.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22192	DOUBLTTP	138	22	line_207	-6.7%	-6.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22196	DUNHILL	69	22	line_207	-7.4%	-7.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22200	DUNHILTP	69	22	line_207	-7.4%	-7.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22204	EASTGATE	69	22	line_207	-7.3%	-7.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22208	EL CAJON	69	22	line_207	-9.0%	-9.1%	line IMPRLVLY to MIGUEL 500 ck 1	

Bus voltage deviation violations not due to addition of the project

Summary of 2010 Heavy Summer Post-transient Power Flow Analysis (Continued)

Bus	Name	kV	Area	Outage	Pre-Project Bus Voltage Deviation	Post-Project Bus Voltage Deviation	Outage description	Comment
22216	ELLIOTT	69	22	line_207	-8.3%	-8.3%	line IMPRLVLY to MIGUEL 500 ck 1	Bus voltage deviation violations not due to the addition of the project
22228	ENCINA	138	22	line_207	-5.6%	-5.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22252	ENCNITAS	69	22	line_207	-7.4%	-7.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22256	ESCNDIDO	69	22	line_207	-5.2%	-5.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22264	ESCND050	138	22	line_207	-5.4%	-5.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22268	ESCND051	138	22	line_207	-6.0%	-6.0%	line IMPRLVLY to MIGUEL 500 ck 1	
22272	ESCO	69	22	line_207	-5.5%	-5.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22276	F	69	22	line_207	-8.4%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22280	FASHNVLY	69	22	line_207	-8.3%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22284	FELCTATP	69	22	line_207	-5.7%	-5.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22288	FELICITA	69	22	line_207	-5.7%	-5.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22292	FENTON	69	22	line_207	-6.9%	-6.9%	line IMPRLVLY to MIGUEL 500 ck 1	
22296	FENTONTP	69	22	line_207	-6.9%	-6.9%	line IMPRLVLY to MIGUEL 500 ck 1	
22300	FRIARS	138	22	line_207	-7.7%	-7.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22304	FSHNVLT	69	22	line_207	-8.3%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22306	GARFIELD	69	22	line_207	-9.0%	-9.0%	line IMPRLVLY to MIGUEL 500 ck 1	
22316	GENESEE	69	22	line_207	-7.4%	-7.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22324	GLENCLEIF	69	22	line_207	-7.5%	-7.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22328	GLNCLFTP	69	22	line_207	-7.5%	-7.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22332	GOALLINE	69	22	line_207	-5.5%	-5.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22336	GRANITE	69	22	line_207	-9.1%	-9.1%	line IMPRLVLY to MIGUEL 500 ck 1	
22352	IMPRLBCH	69	22	line_207	-9.4%	-9.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22364	JAMACHA	69	22	line_207	-9.4%	-9.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22372	KEARNY	69	22	line_207	-8.4%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22380	KETTNER	69	22	line_207	-9.3%	-9.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22384	KYOCERA	69	22	line_207	-8.4%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22388	KYOCRATP	69	22	line_207	-8.4%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22392	LA JOLLA	69	22	line_207	-8.0%	-8.0%	line IMPRLVLY to MIGUEL 500 ck 1	
22404	LILAC	69	22	line_207	-5.4%	-5.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22408	LOSCOCHS	69	22	line_207	-8.9%	-8.9%	line IMPRLVLY to MIGUEL 500 ck 1	
22412	LOSCOCHS	138	22	line_207	-8.6%	-8.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22416	LOVELAND	69	22	line_207	-8.9%	-8.9%	line IMPRLVLY to MIGUEL 500 ck 1	
22420	MAIN ST	69	22	line_207	-9.6%	-9.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22424	MAINST50	138	22	line_207	-8.7%	-8.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22428	MAINST51	138	22	line_207	-8.7%	-8.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22436	MDWLRKTP	138	22	line_207	-6.0%	-6.0%	line IMPRLVLY to MIGUEL 500 ck 1	
22442	MELRSETP	69	22	line_207	-5.1%	-5.1%	line IMPRLVLY to MIGUEL 500 ck 1	

Summary of 2010 Heavy Summer Post-transient Power Flow Analysis (Continued)

Bus	Name	kV	Area	Outage	Pre-Project Bus Voltage Deviation	Post-Project Bus Voltage Deviation	Outage description	Comment
22444	MESA RIM	69	22	line_207	-7.3%	-7.3%	line IMPRLVLY to MIGUEL 500 ck 1	Bus voltage deviation violations not due to the addition of the project
22448	MESAHGTS	69	22	line_207	-8.4%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22456	MIGUEL	69	22	line_207	-9.5%	-9.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22460	MIGUEL	138	22	line_207	-9.2%	-9.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22464	MIGUEL	230	22	line_207	-9.5%	-9.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22468	MIGUEL	500	22	line_207	-10.6%	-10.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22472	MIGUELMP	500	22	line_207	-9.6%	-9.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22476	MIGUELTP	69	22	line_207	-9.5%	-9.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22480	MIRAMAR	69	22	line_207	-7.1%	-7.1%	line IMPRLVLY to MIGUEL 500 ck 1	
22484	MIRAMAR1	69	22	line_207	-6.6%	-6.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22492	MIRAMRTP	69	22	line_207	-7.3%	-7.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22496	MISSION	69	22	line_207	-8.4%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22500	MISSION	138	22	line_207	-7.8%	-7.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22504	MISSION	230	22	line_207	-7.5%	-7.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22508	MNSFRATTP	69	22	line_207	-5.0%	-5.1%	line IMPRLVLY to MIGUEL 500 ck 1	
22512	MONSRATE	69	22	line_207	-5.1%	-5.1%	line IMPRLVLY to MIGUEL 500 ck 1	
22516	MONTGMRY	69	22	line_207	-9.4%	-9.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22520	MONTGYTP	69	22	line_207	-9.4%	-9.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22532	MURRAY	69	22	line_207	-8.9%	-8.9%	line IMPRLVLY to MIGUEL 500 ck 1	
22540	NARROWS	69	22	line_207	-8.4%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22548	NATNLCTY	69	22	line_207	-9.6%	-9.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22556	NAVSTMTR	69	22	line_207	-9.7%	-9.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22568	NCMETER	138	22	line_207	-6.0%	-6.0%	line IMPRLVLY to MIGUEL 500 ck 1	
22572	NCMETRTP	138	22	line_207	-6.0%	-6.0%	line IMPRLVLY to MIGUEL 500 ck 1	
22576	NOISLMTR	69	22	line_207	-9.6%	-9.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22580	NORTHCTY	138	22	line_207	-6.5%	-6.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22592	OLD TOWN	69	22	line_207	-8.6%	-8.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22596	OLD TOWN	230	22	line_207	-7.3%	-7.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22604	OTAY	69	22	line_207	-9.3%	-9.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22608	OTAY TP	69	22	line_207	-9.3%	-9.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22612	OTAYLAKE	69	22	line_207	-7.8%	-7.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22616	OTAYLKTP	69	22	line_207	-9.0%	-9.0%	line IMPRLVLY to MIGUEL 500 ck 1	
22620	PACFCBCH	69	22	line_207	-8.4%	-8.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22624	PALA	69	22	line_207	-5.3%	-5.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22632	PALOMAR	138	22	line_207	-5.7%	-5.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22636	PARADISE	69	22	line_207	-9.6%	-9.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22640	PENDLETN	69	22	line_207	-5.0%	-5.0%	line IMPRLVLY to MIGUEL 500 ck 1	

Summary of 2010 Heavy Summer Post-transient Power Flow Analysis (Continued)

Bus	Name	kV	Area	Outage	Pre-Project Bus Voltage Deviation	Post-Project Bus Voltage Deviation	Outage description	Comment
22644	PENSQTOS	69	22	line_207	-7.3%	-7.3%	line IMPRLVLY to MIGUEL 500 ck 1	Bus voltage deviations not due to the addition of the project
22648	PENSQTOS	138	22	line_207	-6.7%	-6.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22652	PENSQTOS	230	22	line_207	-6.8%	-6.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22660	POINTLMA	69	22	line_207	-8.7%	-8.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22664	POMERADO	69	22	line_207	-7.2%	-7.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22668	POWAY	69	22	line_207	-7.0%	-7.0%	line IMPRLVLY to MIGUEL 500 ck 1	
22672	PRCTRVLY	138	22	line_207	-9.2%	-9.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22676	R.CARMEL	69	22	line_207	-6.9%	-6.9%	line IMPRLVLY to MIGUEL 500 ck 1	
22680	R.SNTAFE	69	22	line_207	-6.9%	-6.9%	line IMPRLVLY to MIGUEL 500 ck 1	
22684	R.SNTATP	69	22	line_207	-7.2%	-7.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22688	RINCON	69	22	line_207	-5.7%	-5.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22692	ROSCYNTP	69	22	line_207	-8.0%	-8.0%	line IMPRLVLY to MIGUEL 500 ck 1	
22696	ROSE CYN	69	22	line_207	-8.0%	-8.0%	line IMPRLVLY to MIGUEL 500 ck 1	
22700	SAMPSON	69	22	line_207	-9.6%	-9.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22712	SANLUSRY	138	22	line_207	-5.6%	-5.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22724	SANMRCOS	69	22	line_207	-5.2%	-5.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22736	SANTYSBL	69	22	line_207	-8.2%	-8.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22740	SANYSDRO	69	22	line_207	-9.1%	-9.1%	line IMPRLVLY to MIGUEL 500 ck 1	
22756	SCRIPPS	69	22	line_207	-7.2%	-7.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22760	SHADOWR	138	22	line_207	-5.6%	-5.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22768	SOUTHBAY	69	22	line_207	-9.4%	-9.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22772	SOUTHBAY	138	22	line_207	-8.7%	-8.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22796	SPRNGVLY	69	22	line_207	-9.5%	-9.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22800	STREAMVW	69	22	line_207	-9.7%	-9.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22812	SUNYSDTP	69	22	line_207	-9.5%	-9.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22816	SUNYSIDE	69	22	line_207	-9.5%	-9.5%	line IMPRLVLY to MIGUEL 500 ck 1	
22820	SWEETWTR	69	22	line_207	-9.5%	-9.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22824	SWTWTRTP	69	22	line_207	-9.6%	-9.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22828	SYCAMORE	69	22	line_207	-7.3%	-7.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22832	SYCAMORE	230	22	line_207	-6.8%	-6.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22852	TELECYN	138	22	line_207	-9.0%	-9.1%	line IMPRLVLY to MIGUEL 500 ck 1	
22856	TOREYPNS	69	22	line_207	-7.4%	-7.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22864	UCM	69	22	line_207	-7.4%	-7.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22868	URBAN	69	22	line_207	-9.6%	-9.6%	line IMPRLVLY to MIGUEL 500 ck 1	
22870	VALCNTR	69	22	line_207	-5.7%	-5.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22872	WABASH	69	22	line_207	-9.7%	-9.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22876	WARCYNTP	69	22	line_207	-6.7%	-6.7%	line IMPRLVLY to MIGUEL 500 ck 1	

Summary of 2010 Heavy Summer Post-transient Power Flow Analysis (Continued)

Bus	Name	kV	Area	Outage	Pre-Project Bus Voltage Deviation	Post-Project Bus Voltage Deviation	Outage description	Comment
22880	WARENCYN	69	22	line_207	-6.7%	-6.7%	line IMPRLVLY to MIGUEL 500 ck 1	Bus voltage deviation violations not due to the addition of the project
22884	WARNERS	69	22	line_207	-7.7%	-7.7%	line IMPRLVLY to MIGUEL 500 ck 1	
22378	KEAMDGT2	69	22	line_207	-8.4%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22379	KEAMDGT3	69	22	line_207	-8.4%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22602	OMWD	69	22	line_207	-5.7%	-5.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22902	CRESTWD	69	22	line_207	-6.3%	-6.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22258	RAMCO_ES	69	22	line_207	-5.2%	-5.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22618	RAMCO_OY	69	22	line_207	-9.3%	-9.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22073	LRKSP_BD	69	22	line_207	-7.3%	-7.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22734	SANTEE	138	22	line_207	-8.2%	-8.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22009	ARTESN	69	22	line_207	-6.7%	-6.8%	line IMPRLVLY to MIGUEL 500 ck 1	
22308	GEN DYNM	69	22	line_207	-8.4%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22312	GENDYNTP	69	22	line_207	-8.4%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22904	CAMPOGEN	35	22	line_207	-5.3%	-5.3%	line IMPRLVLY to MIGUEL 500 ck 1	
22254	ENVIREPL	69	22	line_207	-5.1%	-5.1%	line IMPRLVLY to MIGUEL 500 ck 1	
22831	SYCAMORE	138	22	line_207	-7.1%	-7.2%	line IMPRLVLY to MIGUEL 500 ck 1	
22603	Lkhodges	69	22	line_207	-6.0%	-6.0%	line IMPRLVLY to MIGUEL 500 ck 1	
22865	GRNT HLL	138	22	line_207	-8.4%	-8.4%	line IMPRLVLY to MIGUEL 500 ck 1	
22410	LOSCOCTP	69	22	line_207	-9.0%	-9.1%	line IMPRLVLY to MIGUEL 500 ck 1	
24017	BLYTHESC	161	24	line_206	-7.9%	-6.0%	line HASSYAMP to N.GILA 500 ck 1	
24035	EAGLEMTN	161	24	line_231	5.2%	5.3%	line J.HINDS to EAGLEMTN 230 ck 1	
8122	YUCCA161	161	8	line_206	-5.9%	-5.0%	line HASSYAMP to N.GILA 500 ck 1	
8367	PILOTKNB	161	8	line_206	-6.0%	-5.2%	line HASSYAMP to N.GILA 500 ck 1	
8391	PKNOBD2	100	8	line_206	-5.9%	-5.1%	line HASSYAMP to N.GILA 500 ck 1	
24017	BLYTHESC	161	24	line_265	-15.1%	-15.1%	line BLYTHESC to BLYTHE 161 ck 1	

Summary of 2010 heavy Summer Post-transient Reactive Power Margin Analysis

Outage	Monitored Bus		Reactive Power Margin (MVar)		Comments
	Bus Number	Bus Name	Pre-project	Post-project	
N.LAQUIN-AVE42 92 kV LINE	8805	AV58 161 kV	169	170	Addition of North Brawley Project did not impact the existing reactive power margins
	8808	CVSUB161 161 kV	189	190	
	8292	N.LAQUIN 92 kV	46	46	
	8312	COACHELA 92 kV	196	199	
	8700	MIDWAY 92 kV	103	103	
	8361	NILAND 92 kV	221	247	
	8335	ELSTEAMP 92 kV	533	577	
	8397	CLX92 92 kV	270	287	
	8369	PILOTKNB 92 kV	184	184	
	8319	DIXIELAN 92 kV	459	470	
N.GILA-IMPERIAL VALLEY 500 kV LINE	8805	AV58 161 kV	147	164	Addition of North Brawley Project did not impact the existing reactive power margin
	8808	CVSUB161 161 kV	150	170	
	8292	N.LAQUIN 92 kV	108	119	
	8312	COACHELA 92 kV	138	159	
	8700	MIDWAY 92 kV	68	76	
	8361	NILAND 92 kV	188	227	
	8335	ELSTEAMP 92 kV	400	473	
	8397	CLX92 92 kV	226	249	
	8369	PILOTKNB 92 kV	176	182	
	8319	DIXIELAN 92 kV	386	407	

Summary of 2010 heavy Summer Post-transient Reactive Power Margin Analysis

Outage	Monitored Bus		Reactive Power Margin (MVar)		Comments
	Bus Number	Bus Name	Pre-project	Post-project	
IMPERIAL VALLEY-MIGUEL 500 KV LINE	8805	AV58 161 kV	139	136	Addition of North Brawley Project impacted the existing reactive power margins though not very significant.
	8808	CVSUB161 161 kV	146	144	
	8292	N.LAQUIN 92 kV	103	99	
	8312	COACHELA 92 kV	139	137	
	8700	MIDWAY 92 kV	69	67	
	8361	NILAND 92 kV	209	230	
	8335	ELSTEAMP 92 kV	515	562	
	8397	CLX92 92 kV	279	296	
	8369	PILOTKNB 92 kV	188	187	
8319	DIXIELAN 92 kV	479	492		
PALO VERDE-DEVERS 500 KV LINE	8805	AV58 161 kV	150	151	Addition of North Brawley Project did not impact the existing reactive power margin
	8808	CVSUB161 161 kV	157	159	
	8292	N.LAQUIN 92 kV	112	112	
	8312	COACHELA 92 kV	150	152	
	8700	MIDWAY 92 kV	76	76	
	8361	NILAND 92 kV	207	233	
	8335	ELSTEAMP 92 kV	484	539	
	8397	CLX92 92 kV	261	281	
	8369	PILOTKNB 92 kV	180	180	
8319	DIXIELAN 92 kV	446	461		

Summary of 2010 heavy Summer Post-transient Reactive Power Margin Analysis

Outage	Monitored Bus		Reactive Power Margin (MVar)		Comments
	Bus Number	Bus Name	Pre-project	Post-project	
ELSTM 2 & REPU 2 GENERATOR OUTAGE	8805	AV58 161 kV	206	207	Addition of North Brawley Project did not impact the existing reactive power margins
	8808	CVSUB161 161 kV	216	219	
	8292	N.LAQUIN 92 kV	152	153	
	8312	COACHELA 92 kV	225	230	
	8700	MIDWAY 92 kV	110	110	
	8361	NILAND 92 kV	222	251	
	8335	ELSTEAMP 92 kV	507	555	
	8397	CLX92 92 kV	254	273	
	8369	PILOTKNB 92 kV	184	185	
	8319	DIXIELAN 92 kV	448	463	
ELCENTSW-IMPERIAL VALLEY 230 kV LINE	8805	AV58 161 kV	204	204	Addition of North Brawley Project did not impact the existing reactive power margin
	8808	CVSUB161 161 kV	214	215	
	8292	N.LAQUIN 92 kV	151	150	
	8312	COACHELA 92 kV	225	227	
	8700	MIDWAY 92 kV	109	109	
	8361	NILAND 92 kV	227	253	
	8335	ELSTEAMP 92 kV	546	590	
	8397	CLX92 92 kV	274	289	
	8369	PILOTKNB 92 kV	185	185	
8319	DIXIELAN 92 kV	466	475		

EXHIBIT 30

IID Interim Water Supply Policy for Non-Agricultural Projects

1.0 Purpose.

Imperial Irrigation District (the District) is developing an Integrated Water Resources Management Plan (IWRMP) that will identify and recommend potential programs and projects to develop new water supplies and new storage, enhance the reliability of existing supplies, and provide more flexibility for District water department operations, all in order to maintain service levels within the District's existing water service area. The first phase of the IWRMP is scheduled to be completed by the end of 2009 and will identify potential projects, implementation strategies and funding sources. Pending development of the IWRMP, the District is adopting this Interim Water Supply Policy (IWSP) for Non-Agricultural Projects, as defined below, in order to address proposed projects that will rely upon a water supply from the District during the time that the IWRMP is still under development. It is anticipated that this IWSP will be modified and/or superseded to take into consideration policies and data developed by the IWRMP.

2.0 Background.

The IWRMP will enable the District to more effectively manage existing water supplies and to maximize the District's ability to store or create water when the available water supplies exceed the demand for such water. The stored water can be made available for later use when there is a higher water demand. Based upon known pending requests to the District for water supply assessments/verifications and pending applications to the County of Imperial for various Non-Agricultural Projects, the District currently estimates that up to 50,000 acre feet per year (afy) of water could potentially be requested for Non-Agricultural Projects over the next ten to twenty years. Under the IWRMP the District shall evaluate the projected water demand of such projects and the potential means of supplying that amount of water. This IWSP currently designates up to 25,000 afy of water for potential Non-Agricultural Projects within IID's water service area. Proposed Non-Agricultural projects may be required to pay a Reservation Fee, further described below. The reserved water shall be available for other users until such Non-Agricultural projects are implemented and require the reserved water supply. This IWSP shall remain in effect pending the approval of further policies that will be adopted in association with the IWRMP.

3.0 Terms and Definitions.

3.1 Agricultural Use. Uses of water for irrigation, crop production and leaching.

3.2 Connection Fee. A fee established by the District to physically connect a new Water User to the District water system.

3.3 Industrial Use. Uses of water that are not Agricultural or Municipal, as defined herein, such as manufacturing, mining, cooling water supply, energy generation, hydraulic conveyance, gravel washing, fire protection, oil well re-pressurization and industrial process water.

3.4 Municipal Use. Uses of water for commercial, institutional, community, military, or public water systems, whether in municipalities or in unincorporated areas of Imperial County.

3.5 Mixed Use. Uses of water that involve a combination of Municipal Use and Industrial Use.

3.6 Non-Agricultural Project. Any project which has a water use other than Agricultural Use, as defined herein.

3.7 Processing Fee. A fee charged by the District Water Department to reimburse the District for staff time required to process a request for water supply for a Non-Agricultural Project.

3.8 Reservation Fee. A non-refundable fee charged by the District when an application for water supply for a Non-Agricultural Project is deemed complete and approved. This fee is intended to offset the cost of setting aside the projected water supply for the project during the period commencing from the completion of the application to start-up of construction of the proposed project and/or execution of a water supply agreement. The initial payment of the Reservation Fee will reserve the projected water supply for up to two years. The Reservations Fee is renewable for up to two additional two-year periods upon payment of an additional fee for each renewal.

3.9 Water Supply Development Fee. An annual fee charged to some Non-Agricultural Projects by the District, as further described in Section 5.2 herein. Such fees shall assist in funding IWRMP or related water supply projects,

3.10 Water User. A person or entity that orders or receives water service from the District.

4.0. CEQA Compliance.

4.1 The responsibility for CEQA compliance for new development projects within the unincorporated area of the County of Imperial attaches to the County of Imperial or, if the project is within the boundaries of a municipality, the particular municipality. The District will coordinate with the County of Imperial and relevant municipalities to help ensure that the water supply component of their respective general plans is comprehensive and based upon current information. Among other things, the general plans should assess the direct, indirect and cumulative potential impacts on the environment of using currently available water supplies for new industrial, municipal, commercial and/or institutional uses instead of the historical use of that water for agriculture. Such a change in land use, and the associated water use,

could potentially impact land uses, various aquatic and terrestrial species, water quality, air quality and the conditions of drains, rivers and the Salton Sea.

4.2 When determining whether to approve a water supply agreement for any Non-Agricultural Project pursuant to this IWSP, the District will consider whether potential environmental and water supply impacts of such proposed projects have been adequately assessed, appropriate mitigation has been developed and appropriate conditions have been adopted by the relevant land use permitting/approving agencies, before the District approves any water supply agreement for such project.

5.0. Applicability of Fees for Non-Agricultural Projects.

5.1 Pursuant to this Interim Water Supply Policy, applicants for water supply for a Non-Agricultural Project shall be required to pay a Processing Fee and may be required to pay a Reservation Fee as shown in Table A. All Water Users shall also pay the applicable Connection Fee, if necessary, and regular water service fees according to the District water rate schedules, as modified from time to time.

5.2 A Non-Agricultural Project may also be subject to an annual Water Supply Development Fee, depending upon the nature, complexity, and water demands of the proposed project. The District will determine whether a proposed Non-Agricultural Project is subject to the Water Supply Development Fee for water supplied pursuant to this IWSP as follows:

5.2.1. A proposed project that will require water for a Municipal Use shall be subject to an annual Water Supply Development Fee as set forth in Table B if the projected water demand for the project is in excess of the project's estimated population multiplied by the District-wide per capita usage. Municipal Use projects without an appreciable residential component will be analyzed under sub-section 5.2.3.

5.2.2. A proposed project that will require water for an Industrial Use located in an unincorporated area of the County of Imperial shall be subject to an annual Water Supply Development Fee as set forth in Table B.

5.2.3. The applicability of the Water Supply Development Fee set forth in Table B to Mixed Use projects, Industrial Use projects located within a municipality, or Municipal Use projects without an appreciable residential component, will be determined by the District on a case-by-case basis, depending upon the proportion of types of land uses and the water demand proposed for the project.

5.3. A proposed Water User for a Non-Agricultural Projects may elect to provide some or all of the required water supply by paying for and implementing some other means of providing water in a manner approved by the District, such as conservation projects, water storage projects and/or use of an alternative source of supply, such as recycled water or some source of water other than from the District water supply. Such election shall require consultation with the District regarding the

details of such alternatives and a determination by the District, in its reasonable discretion, concerning how much credit, if any, should be given for such alternative water supply as against the project's water demand for purposes of determining the annual Water Supply Development Fee for such project.

5.4 The District Board shall have the right to modify the fees shown on Tables A and B from time to time.

6. Water Supply Development Fees collected by the District under this IWSP shall be accounted for independently, including reasonable accrued interest, and such fees shall only be used to help fund IWRMP or related District water supply projects.

7. Any request for water service for a proposed Non-Agricultural Project that meets the criteria for a water supply assessment pursuant to Water Code Sections 10910-10915 or a water supply verification pursuant to Government Code Section 66473.7 shall include all information required by Water Code Sections 10910 -10915 or Government Code Section 66473.7 to enable the District to prepare the water supply assessment or verification. All submittals should include sufficient detail and analysis regarding the project's water demands, including types of land use and per capita water usage, necessary to make the determinations outlined in Section 5.2.

8. Any request for water service for a proposed Non-Agricultural Project that does not meet the criteria for a water supply assessment pursuant to Water Code Section 10910-10915 or water supply verification pursuant to Government Code Section 66473.7 shall include a complete project description with a detailed map or diagram depicting the footprint of the proposed project, the size of the footprint, projected water demand at full implementation of the project and a schedule for implementing water service. All submittals should include sufficient detail and analysis regarding the project's water demands, including types of land use and per capita water usage, necessary to make the determinations outlined in Section 5.2.

9. All other District rules and policies regarding a project applicant or Water User's responsibility for paying connection fees, costs of capital improvements and reimbursing the District for costs of staff and consultant's time, engineering studies and administrative overhead required to process and implement projects remain in effect.

10. Municipal Use customers shall be required to follow appropriate water use efficiency best management practices (BMPs), including, but not limited to those established by the California Urban Water Conservation Council BMP's (see <http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx>), or other water use efficiency standards, adopted by the District or local government agencies.

11. Industrial Use customers shall be required to follow appropriate water use efficiency BMP's, including but not limited to those established by the California Urban Water Conservation Council and California Energy Commission, as well as other water use efficiency standards, adopted by the District or local government agencies.

12. The District may prescribe additional or different BMPs for certain categories of Municipal and Industrial Water Users.

ADAMS BROADWELL JOSEPH & CARDOSO

APR 29 2011

RECEIVED

EXHIBIT 31





ADAMS BROADWELL JOSEPH & CARDOZO

A PROFESSIONAL CORPORATION

ATTORNEYS AT LAW

601 GATEWAY BOULEVARD, SUITE 1000
SOUTH SAN FRANCISCO, CA 94080-7037

TEL: (650) 589-1660
FAX: (650) 589-5062

jjaurain@adamsbroadwell.com

SACRAMENTO OFFICE

520 CAPITOL MALL, SUITE 350
SACRAMENTO, CA 95814-4721

TEL: (916) 444-6201
FAX: (916) 444-6208

DANIEL L. CARDOZO
THOMAS A. ENSLOW
TANYA A. GULESSERIAN
JASON W. HOLDER
MARC D. JOSEPH
ELIZABETH KLEBANER
RACHAEL E. KOSS
ROBYN C. PURCHIA

OF COUNSEL
THOMAS R. ADAMS
ANN BROADWELL

March 30, 2011

VIA FACSIMILE AND U.S. MAIL

Mr. Brad Poiriez
APCO
Imperial County APCD
150 South 9th Street
El Centro, CA 92243-2801
Fax: (760) 353-9904

Re: Public Records Act Request – East Brawley Geothermal Power Plant Project

Dear Mr. Poiriez:

We are writing on behalf of the California Unions for Reliable Energy (“CURE”) to request a copy of any and all documents in the possession of the Imperial County Air Pollution Control District regarding the East Brawley Geothermal Power Plant Project (“Project”), proposed to be located approximately 3 miles north of Brawley, at the intersection of Shank and Rutherford roads in unincorporated Imperial County. The Project is a 49.9 MW geothermal power plant and well field proposed by ORMAT Nevada, Inc. Our request includes, but is not limited to:

1. all correspondence including email communications;
2. all permit applications and supporting materials in native file format; and
3. all draft and final permits and permit renewal documents.

This request is made pursuant to the California Public Records Act. (Government Code §§ 6250, et seq.) This request is also made pursuant to Article I, section 3(b) of the California Constitution, which provides a Constitutional right of access to information concerning the conduct of government. Article I, section 3(b) provides that any statutory right to information shall be broadly construed to

Mr. Brad Poiriez
March 30, 2011
Page 2

provide the greatest access to government information and further requires that any statute that limits the right of access to information shall be narrowly construed.

We will pay for any direct costs of duplication associated with filling this request up to \$200. However, please contact me at (650) 589-1660 with a cost estimate before copying/scanning the materials.

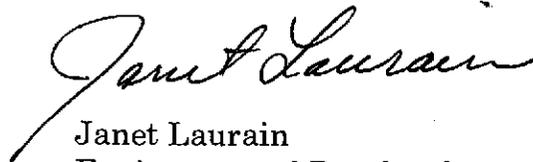
Pursuant to Government Code Section 6253.9, if the requested documents are in electronic format and are 10 MB or less (or can be easily broken into sections of 10 MB or less), please email them to me as attachments.

My contact information is:

Janet Laurain
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080-7037
jlaurain@adamsbroadwell.com

Please call me at if you have any questions. Thank you for your assistance with this matter.

Sincerely,

A handwritten signature in cursive script that reads "Janet Laurain". The signature is written in black ink and is positioned above the typed name and title.

Janet Laurain
Environmental Paralegal

JML:vs

MESSAGE CONFIRMATION

MAR-30-2011 04:47 PM WED

FAX NUMBER : 16505895062
NAME : ADAMS BROADWELL JOSE

NAME/NUMBER : 17603539904-2328
PAGE : 3
START TIME : MAR-30-2011 04:46PM WED
ELAPSED TIME : 00' 24"
MODE : STD ECM
RESULTS : [O.K]

ADAMS BROADWELL JOSEPH & CARDOZO

FAX TRANSMITTAL

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This message is for addressee only. Review, distribution or copy by others is strictly prohibited.
Notify us immediately by telephone if you received this message in error and return the original.

TO: Mr. Brad Poiriez FAX NO: (760) 353-9904
FROM: Valerie A. Stevenson DATE: March 30, 2011
ENCLOSURE: Please see attached letter.
PAGES, including cover: 3

601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080-7037
Telephone: (650) 589-1660
Facsimile: (650) 589-5062
E-mail: vstevenson@adamsbroadwell.com

ADAMS BROADWELL JOSEPH & CARDOZO

FAX TRANSMITTAL

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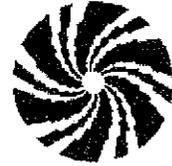
TO: Mr. Brad Poiriez **FAX NO:** (760) 353-9904
FROM: Valerie A. Stevenson **DATE:** March 30, 2011
ENCLOSURE: Please see attached letter.
PAGES, including cover: 3

601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080-7037
Telephone: (650) 589-1660
Facsimile: (650) 589-5062
E-mail: vstevenson@adamsbroadwell.com

EXHIBIT 32



ORMAT®



August 4, 2009

Mr. Jurg Heuberger, Director
County of Imperial
Planning & Development Services Department
801 Main Street
El Centro, CA 92243-2811

Subject: Amendment to Conditional Use Permit Application - East Brawley
Geothermal Development Project

Dear Mr. Heuberger:

ORNI 19, LLC/Ormat Nevada Inc. submitted a Conditional Use Permit for this geothermal development project in August 2008. As you know, the project is on hold pending submittal of the SB 610 water analysis and the will serve letter from IID. The water assessment is complete and will be submitted under separate cover by Development, Design & Engineering, Inc. In the meantime, the project has changed slightly based on additional land that has been leased and/or purchased and the results of our exploration drilling. These updates are reflected in the enclosed document and attachments.

1. Completed CUP Application Form for two additional landowner to this project. The leased land owner is also part of the North Brawley Geothermal Development Project. The other parcels were purchased by ORNI, 17, LLC, a wholly owned subsidiary of Ormat Nevada Inc. (original plus 40 sets);
2. Project Description (original plus 40 sets);

Please contact me at 775-336-0155 if you have any questions or need more information.

Sincerely,

A handwritten signature in cursive script that reads "Charlene L. Wardlow".

Charlene L. Wardlow
Director Business Development

ORMAT NEVADA INC.
6225 NEIL ROAD, RENO, NEVADA 89511



Enclosures

cc: Marie Barrett, Barrett Biological Services
David Black, Imperial County Planning and Development Services
Dwight Carey, EMA, Inc.
Ron Leiken, Ormat Nevada Inc.
Bill Sherman, Ormat Nevada Inc.
Bob Sullivan, Ormat Nevada Inc.

ORMAT NEVADA INC.
6225 NEIL ROAD, RENO, NEVADA 89511

IMPERIAL COUNTY PLANNING & DEVELOPMENT SERVICES GENERAL INDEMNIFICATION AGREEMENT

As part of this application, applicant and real party in interest, if different, agree to defend, indemnify, hold harmless, and release the County of Imperial ("County"), its agents, officers, attorneys, and employees (including consultants) from any claim, action, or proceeding brought against any of them, the purpose of which is to attack, set aside, void, or annul the approval of this application or adoption of the environmental document which accompanies it. This indemnification obligation shall include, but not be limited to, damages, costs, expenses, attorney fees, or expert witness fees that may be asserted by any person or entity, including the applicant, arising out of or in connection with the approval of this application, whether or not there is concurrent negligence on the part of the County, its agents, officers, attorneys, or employees (including consultants).

If any claim, action, or proceeding is brought against the County, its agents, officers, attorneys, or employees (including consultants), to attack, set aside, void, or annul the approval of the application or adoption of the environmental document which accompanies it, then the following procedures shall apply:

1. The Planning Director shall promptly notify the County Board of Supervisors of any claim, action or proceeding brought by an applicant challenging the County's action. The County, its agents, attorneys and employees (including consultants) shall fully cooperate in the defense of that action.
2. The County shall have final determination on how to best defend the case and may defend it with in-house counsel, or by retaining outside counsel. In either case applicant shall be fully responsible for all costs incurred. Applicant may request to provide his or her own counsel to defend the case, however prior written approval of the County shall be obtained, and said independent counsel shall work with County Counsel to provide a joint defense.

Executed at Reno Nevada California on August 4, 2009

APPLICANT

REAL PARTY IN INTEREST (If different from Applicant)

Name: ORNI 17, LLC

Name Same

By Mark Allen

By Mark Allen

Title AUTHORIZED REPRESENTATIVE

Title AUTHORIZED REPRESENTATIVE

Mailing Address:

Mailing Address:

6225 Neil Road
Reno, NV 89511

ACCEPTED/RECEIVED BY _____ Date _____

PROJECT ID NO _____ APN _____

lh:/S/forms_lists/general indemnification form

APPLICATION CONDITIONAL USE PERMIT

- APPLICANT MUST COMPLETE ALL NUMBERED (black) SPACES - please type or print -

PROPERTY OWNERS NAME 1. ORNI 17, LLC			PHONE 775-356-9029
MAILING ADDRESS 4. 6225 Neil Road		CITY Beav	STATE NV
APPLICANTS NAME 3. Same		PHONE	
MAILING ADDRESS (street / p.o.) 4.		CITY	STATE
ENGINEERS NAME 5. Clint Hale		CAL. LICENSE NO. RCE 42205	PHONE 760-352-2716
MAILING ADDRESS (street / p.o.) 6. 242 N. 84th Street		CITY El Centro	STATE CA
ZIP CODE 89511		ZIP CODE 92243	
PROPERTY (site) ADDRESS 7. Best Road between Ward and Baum Roads on west side			
ASSESSORS PARCEL NO. 8. 037-140-16-01, 037-140-05-01		SIZE OF PROPERTY (in acres or sq. feet) 126.50 and 99.50 acres	
LEGAL DESCRIPTION (attach separate sheet if necessary) Section 15, T13S, R14E, SBM			
9.			

PLEASE PROVIDE CLEAR & CONCISE INFORMATION

DESCRIBE PROPOSED PROJECT (specific use of property) 10. Drill geothermal wells, approximately 6, on 300 ft x 300 ft well pads	
DESCRIBE CURRENT USE OF PROPERTY 11. fallowed farm land	
DESCRIBE PROPOSED SEWER SYSTEM 12. none	
DESCRIBE PROPOSED WATER SYSTEM 13. none	
DESCRIBE PROPOSED FIRE PROTECTION SYSTEM 14. none for well, water and fire extinguishers on-site during drlg	
IS THE PROPOSED USE A BUSINESS? If yes, how many employees will be at this site? 15. <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	

REQUIRED SUPPORT DOCUMENTS

A. DETAILED SITE PLAN (see back side)

B. FEE _____

C. OTHER _____

I / WE CERTIFY THAT I AM / WE ARE THE OWNER(S) OF RECORD AND THE INFORMATION SUPPLIED INFORMATION, TO THE BEST OF MY KNOWLEDGE, IS TRUE AND CORRECT.

William R. Sherman 7-30-09
Print Name DATE

[Signature]
SIGNATURE OF PROPERTY OWNER

Print Name DATE

SIGNATURE OF APPLICANT

APPLICATION RECEIVED BY	DATE	REVIEW / APPROVAL BY OTHER DEPT'S required. <input type="checkbox"/> P.W. <input type="checkbox"/> E.H.S. <input type="checkbox"/> A.P.C.D. <input type="checkbox"/> O.E.S.
APPLICATION DEEMED COMPLETE BY	DATE	
APPLICATION REJECTED BY	DATE	
TENTATIVE HEARING BY	DATE	
FINAL ACTION	<input type="checkbox"/> APPROVED <input type="checkbox"/> DENIED	DATE

FEE

\$ _____

CUP- _____

PLANNING DIVISION - Imperial County

C.U.P.

APPLICATION **CONDITIONAL USE PERMIT**

- APPLICANT MUST COMPLETE ALL NUMBERED (black) SPACES - please type or print -

1.	PROPERTY OWNERS NAME	Victor V. & Janet D. Veysey Trust	PHONE	(760) 344-9800
4.	MAILING ADDRESS	3651 Austin Road	CITY	Brawley
			STATE	CA
			ZIP CODE	92227
3.	PROPERTY APPLICANT'S NAME	Omat Nevada, Inc.	PHONE	(562) 544-5141
4.	MAILING ADDRESS (street / p.o.)	P.O. Box 177	CITY	Brawley
			STATE	CA
			ZIP CODE	92227
5.	ENGINEERS NAME	NA	CAL. LICENSE NO.	NA
			PHONE	NA
6.	MAILING ADDRESS (street / p.o.)	NA	CITY	NA
			STATE	NA
			ZIP CODE	NA
7.	PROPERTY (site) ADDRESS	NA		
8.	ASSESSORS PARCEL NO.	037-140-01, 037-140-02, and 037-160-47	SIZE OF PROPERTY (In acres or sq. feet)	325 acres, 325.47 acres, and 36.27 acres, respectively
9.	LEGAL DESCRIPTION (attach separate sheet if necessary)	See Attached Site Plans (1 of 3) and (3 of 3).		

PLEASE PROVIDE CLEAR & CONCISE INFORMATION

10.	DESCRIBE PROPOSED PROJECT (specific use of property)	North Brawley Geothermal Exploration Project (see attached project description).
11.	DESCRIBE CURRENT USE OF PROPERTY	General Agriculture - Zoned A2G (Geothermal Overlay Zone)
12.	DESCRIBE PROPOSED SEWER SYSTEM	NA
13.	DESCRIBE PROPOSED WATER SYSTEM	NA
14.	DESCRIBE PROPOSED FIRE PROTECTION SYSTEM	NA
15.	IS THE PROPOSED USE A BUSINESS?	If yes, how many employees will be at this site?
	<input type="checkbox"/> yes <input checked="" type="checkbox"/> no	

REQUIRED SUPPORT DOCUMENTS

A. DETAILED SITE PLAN (see back side)

B. FEE _____

C. OTHER _____

I / WE CERTIFY THAT I AM / WE ARE THE OWNER(S) OF RECORD AND THE INFORMATION SUPPLIED IS TRUE AND CORRECT.

John C. Veysey

 Print Name

6-14-06

 DATE

SIGNATURE OF PROPERTY OWNER
 Joseph S. Matlick, Project Manager

 Print Name

May 5, 2006

 DATE

 SIGNATURE OF APPLICANT

APPLICATION RECEIVED BY	DATE	REVIEW / APPROVAL BY
APPLICATION DEEMED COMPLETE BY	DATE	OTHER DEPTS. REQUIRED
APPLICATION REJECTED BY	DATE	<input type="checkbox"/> APCD
TENTATIVE HEARING BY	DATE	<input type="checkbox"/> OES
FINAL ACTION	<input type="checkbox"/> APPROVED <input type="checkbox"/> DENIED	DATE

FEE

\$ _____

CUP- _____

PLANNING DEPARTMENT - Imperial County

C.U.P.

**East Brawley Geothermal Development Project
Amendment to Conditional Use Permit Application**

Submitted August 2009

New River Pipeline Crossing and Revised Well Field

August 6, 2009

New River Pipeline Crossing

Project Description

This project involves the installation of piping over the New River north of the City of Brawley, east of Highway 111 and Andre Road and just south of the City of Brawley's Wastewater Treatment Plant (See attached figure). It will be located on private land (APN 037-140-02-01) owned by Veysey, Victor V. & Janet D and under lease to ORNI 17, LLC in the southeast corner of Tract 118 (see map). Several pipes from geothermal pads on the east side of New River will be extended across the New River (WGS 84 33°1'01.4"/115°31'12.1"). The pipes will allow connection of geothermal wells located on both sides of the river. The river at the crossing will be approximately 12 feet wide and begins at the end of a private road on each side of the river. The crossing will support the following equipment as shown in the attached drawings by Tobey Wade Structural Engineers:

- 2 x 24 inch geothermal brine lines
- 2 x 12 inch Noncondensable gas lines (mostly carbon dioxide)
- A 36 inch cable tray for power and control cables
- A man walkway for maintenance and inspection

The footings to support the pipes will be approximately 15-20 foot square on each side of New River. A total of two footings will be placed approximately 10 feet east and west of the bank of New River. The footings are located in an area of sparse vegetation (photographs attached) consisting of salt cedar (*Tamarix sp.*). The area necessary for construction activities will be approximately 100 feet and will be located east and west of the bank of New River.

The pipes will be constructed of industrial standard designation of "extra heavy" wall thickness. An automatic injection pump shut-off and check-valve

system will immediately stop fluid flow should a leak or break occur in any of the pipes. A system of pressure and flow sensing devices, capable of detecting any leak or spill, would be installed and maintained. Additionally, the pipelines would be inspected on a regular basis. The crossing and pipelines will be designed, engineered, manufactured and assembled to perform and comply with all the relevant county, state and federal regulations such as California Building Code, ASME and OSHA.

The pipe will be positioned through the use of cranes located east and west of the bank of New River. Other construction equipment will include a forklift, water truck, backhoe and loader. The area on each side of the river where the crossing will be anchored is flat and will require minimal grading. No grading permit is anticipated to be required based on the amount of dirt to be moved. The anchors will be away from the river bed. Erosion control measures will be implemented if the final design indicates that protection of the river is needed from potential erosion or run-off during construction. Construction time will be brief; approximately five to six weeks.

Locked gates will be located over the pipelines on each end of the crossing to prevent public access. There will be a walk way area to allow workers to inspect the pipelines, there is no vehicle access. The gates will signed "private property" and "no trespassing" in both English and Spanish.

Biological Impacts

The area was surveyed by Marie Barrett, biologist, on February 10 and 25, 2009. No burrowing owls or burrows were found within the two proposed crossing areas. Two crossing areas had been proposed:

Crossing site	(WGS 84) Latitude/longitude	Comments
North crossing	33°1'01.4"/115°31'12.1"	Less vegetation
South crossing	33°0'55.6"/115°31'19.7"	More vegetation; further distance for construction

The north crossing was selected on the basis that it was not disruptive to vegetation found near the bank and was closer to geothermal pads.

No cattails (*Typha sp.*) or Phragmites (*Phragmites sp.*) are found in or near the crossing so there will be no disturbance to Yuma clapper rail (*Rallus longirostris yumanensis*).

The salt cedar (*Tamarix sp.*) is not a dense thicket in the area of the crossing. The crossing construction will be offset from the bank and minimal disruption to vegetation will occur. The duration of construction will be brief (about one week per side) and no permanent damage will occur. Therefore, no disruption would be expected to the southwestern willow flycatcher (*Empidonax traillii extimus*).

No wheat, alfalfa or Bermuda grass crops are grown within 200 feet of the crossing, therefore, no mountain plover (*Charadrium mongolus*) disturbance would be expected.

If construction is not started within 30 days, a new burrowing owl survey will be required.

There will be no alteration of a stream bed or disruption of waters of the United States. Construction activities will be concentrated to the west and east of the bank of New River with no discharge into the New River. All construction will be above the ordinary high water mark and, therefore, will not be considered to be within a jurisdictional "Water of the United States" (photographs attached).

Cultural Resources

The area was surveyed by Tierra Environmental Services in March 2009. No previously recorded cultural resources were located within the exact project area according to the records search nor were any unrecorded sites found during the site survey. Their report dated March 17, 2009 is attached.

Air Emissions

The pipelines will be closed with no air emission points on this section.

Other Environmental Impacts

There will be no other environmental issues associated with this pipeline crossing

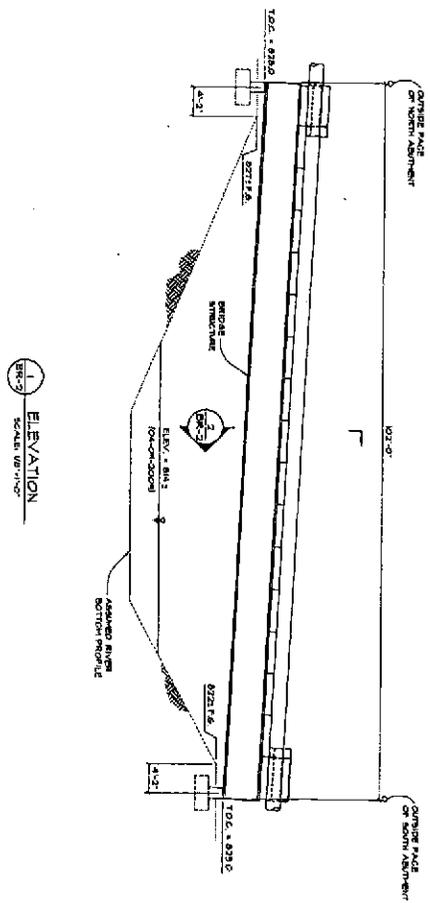
Revised Well Field

The well field is being amended to reflect addition land that has been leased and purchased and the results of the exploration well drilling to date. The total well count has also dropped from 60 to 34 excluding the cooling tower blow down wells. It will still be split about equal between production and injection wells. The New River pipeline crossing is also reflected on the revised map. The amount of pipeline in the well field will be reduced as a result of less wells and a consolidated well field. Several of the well pads on the south end of the field will be best accessed from Shank Road.

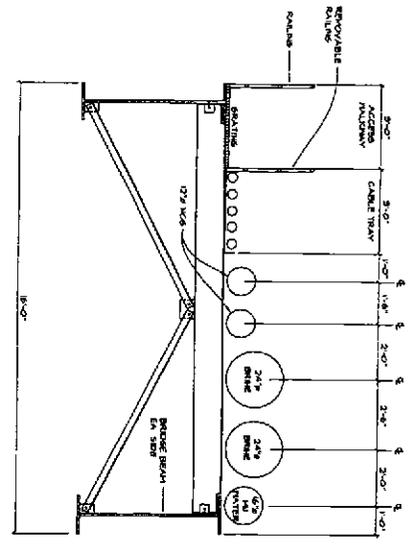
Ormat has obtained an easement from the Imperial Irrigation District (IID) for the transmission line routing along Ward Road to the west of the proposed plant location. They own parcel number 037-160-51-01, a 5.78 acre parcel between the railroad and the Veysey parcel.

Ormat was selected by the City of Brawley to negotiate exclusively for the water from their Waste Water Treatment Plant. Ormat proposes to build the upgrades needed to bring the facility to tertiary treatment and then give the facility to the City and pay for the water via an operations and maintenance agreement. The City will be the CEQA lead agency for this project. The treatment plant will generate enough water for the East Brawley power plant such that canal water from the IID will only need to be a backup once the facility is built.

This realignment of the well field will have less impact than the project as originally proposed as it is smaller. Biological and cultural resource surveys will be performed to duplicate those already completed on the other areas of the project.



1 ELEVATION
BR-2 SCALE 1/8"=1'-0"



2 SECTION
BR-2 SCALE 1/8"=1'-0"

PRELIMINARY
NOT FOR CONSTRUCTION

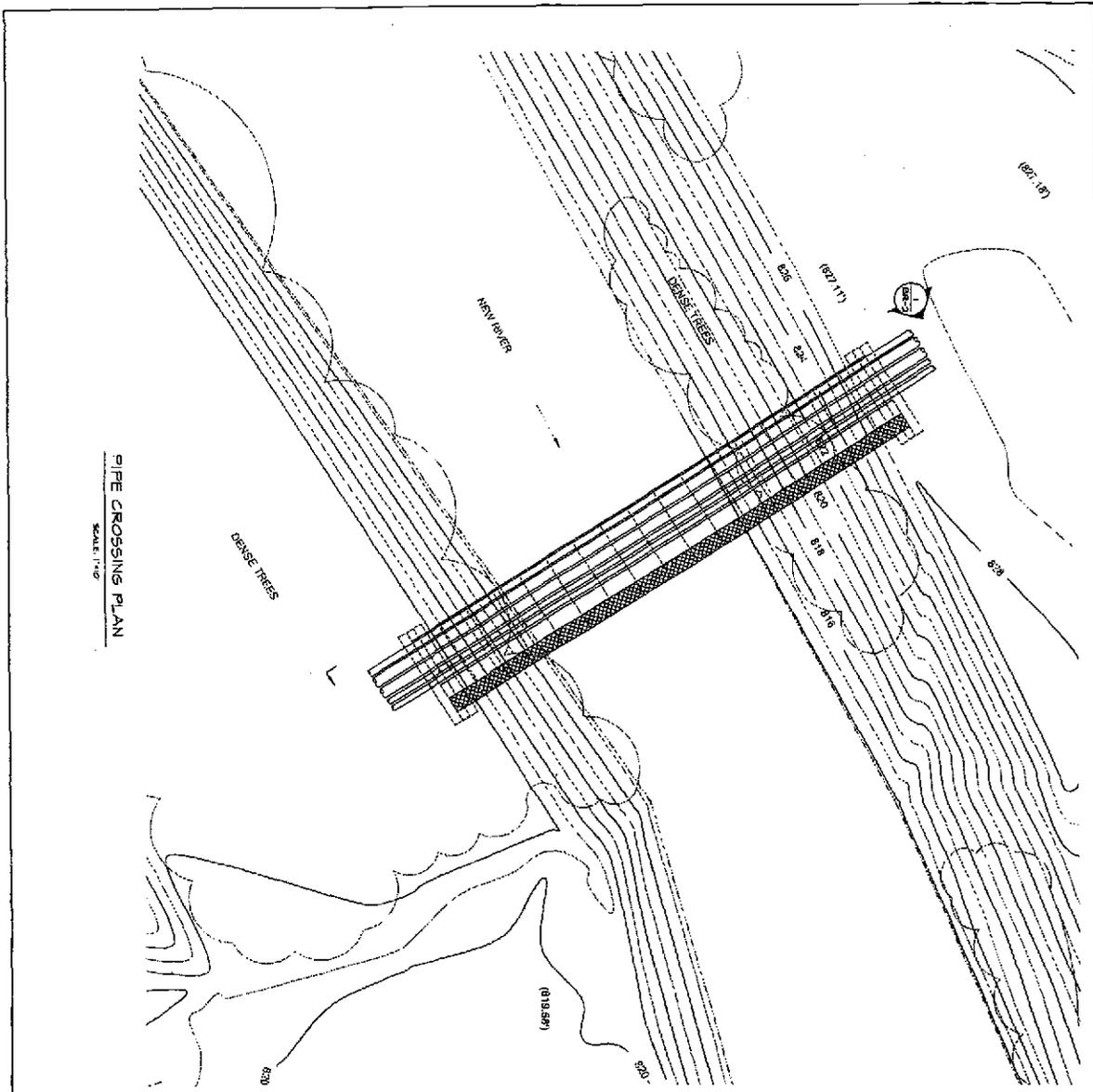
DATE	DESCRIPTION
10/1/00	ISSUED FOR PERMITS
10/1/00	ISSUED FOR CONSTRUCTION
10/1/00	ISSUED FOR RECORD
10/1/00	ISSUED FOR AS-BUILT

NO.	DATE	DESCRIPTION
1	10/1/00	ISSUED FOR PERMITS
2	10/1/00	ISSUED FOR CONSTRUCTION
3	10/1/00	ISSUED FOR RECORD
4	10/1/00	ISSUED FOR AS-BUILT

NEW RIVER PIPE CROSSING SECTIONS AND DETAILS
EAST BRAWLEY PROJECT
 PREPARED FOR
 ORMAT NEVADA INC.
 BRAWLEY IMPERIAL COUNTY CALIFORNIA

tobey wade
 CONSULTING
 329 Flint Street
 Reno, Nevada 89501
 Tel. (775) 324-7757 Fax (775) 324-7797

BR-2



PIPE CROSSING PLAN
SCALE 1"=50'

NOT FOR CONSTRUCTION

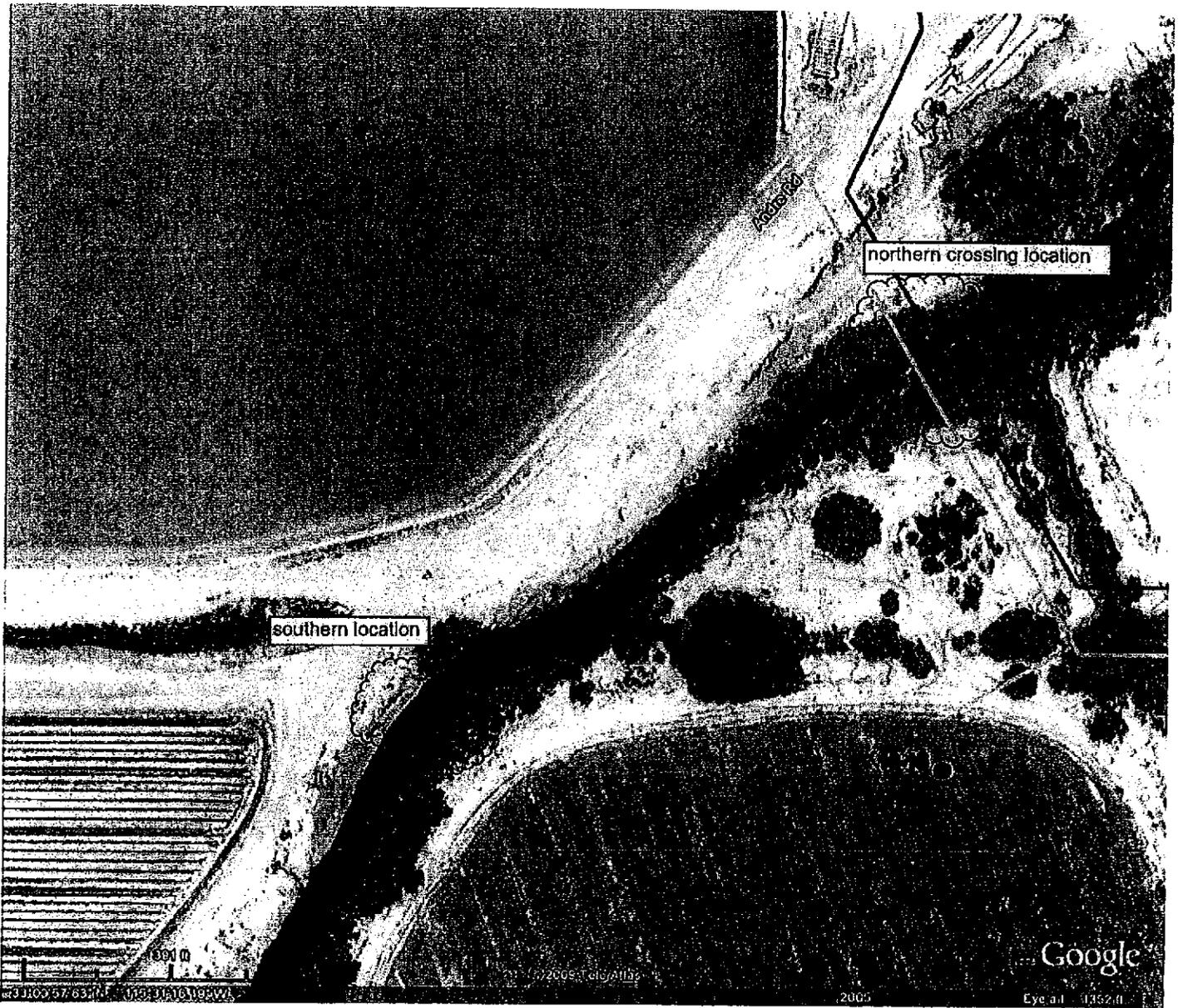
PRELIMINARY
NOT FOR CONSTRUCTION

PROJECT NO.	BR-1
DATE	JUNE 11, 2008
SCALE	1"=50'
PROJECT NAME	NEW RIVER PIPE CROSSING PLAN
CLIENT	ORMAT NEVADA INC.
LOCATION	BRAWLEY, IMPERIAL COUNTY, CALIFORNIA
DESIGNER	Tobey Wade Consulting
CHECKED	
APPROVED	

NO.	DESCRIPTION
1	PIPE CROSSING PLAN
2	
3	
4	
5	
6	
7	
8	
9	
10	

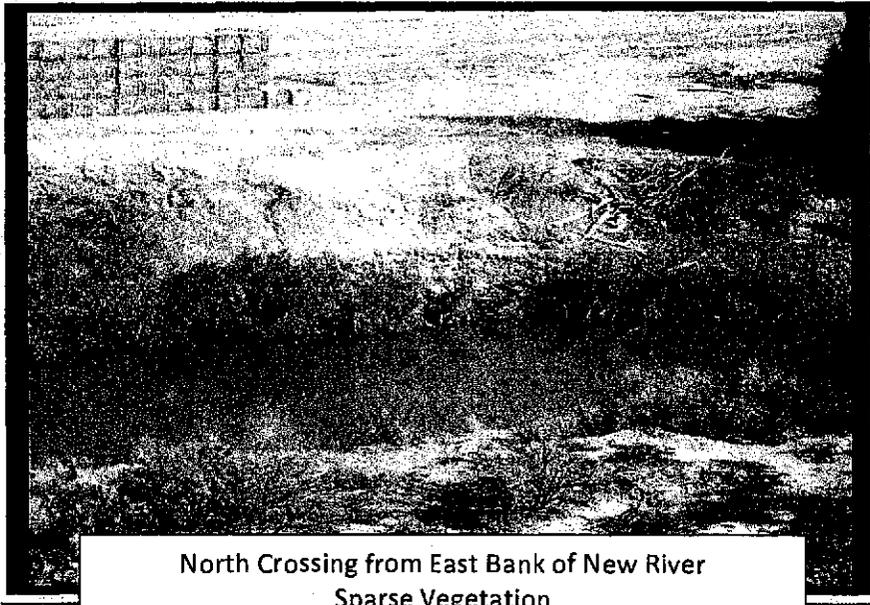
NEW RIVER PIPE CROSSING PLAN
EAST BRAWLEY PROJECT
PREPARED FOR
ORMAT NEVADA INC.
BRAWLEY IMPERIAL COUNTY CALIFORNIA

tobey wade
CONSULTING
329 Flint Street
Reno, Nevada 89501
Tel. (775) 324-7757 Fax (775) 324-7797

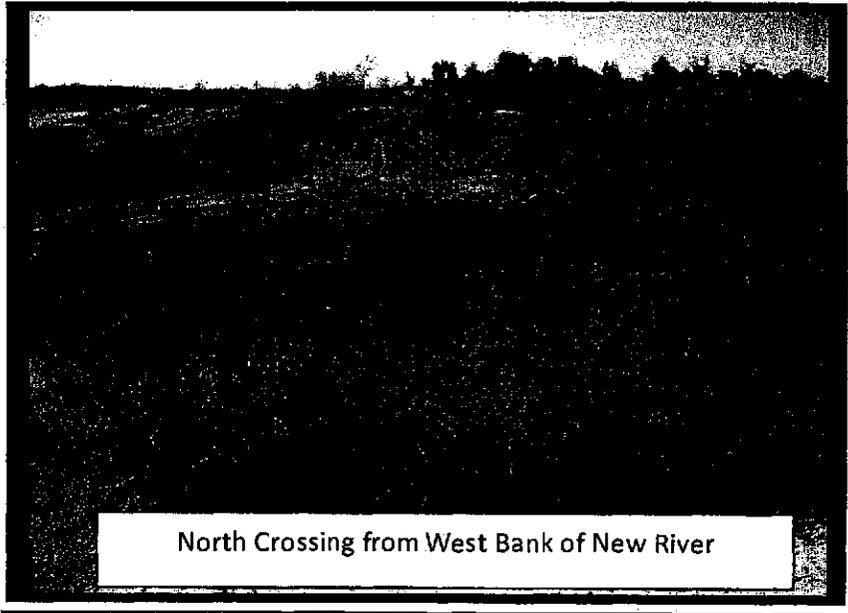


**LOCATIONS EVALUATED FOR PIPELINE CROSSING
OF THE
NEW RIVER**

PIPE CROSSING
PHOTOGRAPHS



North Crossing from East Bank of New River
Sparse Vegetation



North Crossing from West Bank of New River

~~CONFIDENTIAL~~
March 22, 2011

**NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL IMPACT REPORT
FOR ORMAT, EAST BRAWLEY DEVELOPMENT PROJECT, ORNI. 19, LLC.**

NOTICE IS HEREBY GIVEN that the County of Imperial Planning and Development Services Department, as lead agency, is circulating for public review a Draft Environmental Impact Report (EIR) in accordance with the California Environmental Quality Act (CEQA) for the proposed ORMAT, East Brawley Geothermal Development Project, Orni 19, LLC.

Project Title:

**Draft Environmental Impact Report for
ORMAT, East Brawley Geothermal Development Project, Orni 19, LLC.
Conditional Use Permit No. 08-0023
(SCH No. 2010061054).**

Project Location: The southern boundary of the project is located north of the City of Brawley within their sphere of influence and north of Highway 111. The eastern boundary of the project is Dietrich Road and Rutherford Road is to the north. The site is comprised of parcel numbers 037-140-(006, 017, 011) -000.

Project Description: The project would construct a new 49.9 net megawatt binary power plant composed of six Ormat Energy Converters, an expanded geothermal well field beyond the six exploration wells, and pipelines to carry the geothermal brine to the power plant. Also to be constructed are pipelines to carry the cooled brine to injection wells, pipelines to distribute non-condensable gas from production wells to the power plant area and injection wells, an electrical transmission line to interconnect to the substation at the North Brawley 1 Geothermal Power Plant, and a water pipeline to bring water from the Imperial Irrigation District canal to the power plant for cooling water.

Anticipated Significant Effects: The EIR will analyze potential impacts associated with the following: Aesthetics; Agricultural Resources; Air Quality; Biological Resources; Cultural Resources; Cumulative Impacts; Geology/Soils; Greenhouse Gas Emissions/Climate Change; Growth-Inducing Impacts; Hazards/Hazardous Materials; Hydrology/Water Quality; Land Use/Planning; Noise; Public Services/Utilities; and, Transportation/Circulation.

Availability: The Draft EIR/EA can be reviewed at the following location: Imperial County Planning & Development Services Department, 801 Main Street, El Centro, CA 92243.

Comments: Written comments regarding the Draft EIR should be directed to **Angelina Havens, Planner III**, County of Imperial Planning and Development Services Department, 801 Main Street, El Centro, CA 92243 and must be received **no later than May 03, 2011** (public review period March 16, 2011 through May 03, 2011). A Final EIR incorporating public input will be prepared for consideration by the Imperial County Planning Commission and Board of Supervisors at a future public meeting.

AG Commissioner
Connie Valenzuela
852 Broadway
El Centro CA 92243

Assessors
Roy Buckner
940 Main Street
El Centro CA 92243

I.C. Fire/OES
Tony Rouhotas
1078 Dogwood Road Ste 101
Heber CA 92249

IC Sheriffs Office
Steve Gutierrez
328 Applestill Road
El Centro CA 92243

Imperial Irrigation District
Vikki Dee Bradshaw
PO Box 937
Imperial CA 92251

Air Resources Board
PO Box 2815
Sacramento CA 95812

CA Regional Water Quality Control
Board
73-720 Fred Warning Dr. Ste 100
Palm Desert CA 92260-2564

CA Public Utilities Commission
Southern California Office
320 W 4th Street Ste 500
Los Angeles CA 90013

State Historic Preservation Office
PO Box 942896
Sacramento CA 95814

Border Patrol Air Operations
211 West Aten Road
Imperial CA 92251

County Airport
Bill Turner
1099 Airport Road
Imperia CA 92251

County Executive Office
Ralph Cordova
940 Main Street Ste. 208
El Centro CA 92243

Fish & Game Commission
Rosa Lopez
940 Main Street
El Centro CA 92243

I.V. Vegetable Growers Assoc.
PO Box 358
El Centro CA 92243

Farm Bureau
Lindsey Dale
1000 Broadway
El Centro CA 92243

CHP
2331 Highway 86
Imperial CA 92251

Certified Unified Program Agency
627 Wake Avenue
El Centro CA 92243

Department of Conservation
801 K Street MS 18-01
Sacramento CA 95814

BLM
1661 South 4th Street
El Centro CA 92243

Dept of the Army Corp of Engineers
LA District
PO Box 532711
Los Angeles CA 90053-2325

APCD Officer
Brad Poiriez
150 S 9th Street
El Centro CA 92243

EHS
Jeff Lamoure
797 Main Street Ste B
El Centro CA 92243

Public Works
William Brunet
155 South 11th St
El Centro CA 92243

Holtville Tribune
570 Holt Avenue
Hotville CA 92250

Sierra Club
PO Box 444
Ocotillo CA 92259

Caltrans District 11
4050 Taylor Street
San Diego CA 92110

CA Public Utilities Commission
505 Van Ness Avenue
San Francisco CA 94102

Native American Heritage Commission
915 Capitol Mall Room 364
Sacramento CA 95814

Bureau of Reclamation Yuma Area
7301 Calle Agua Salada
Yuma AZ 85364

Marine Corps Air Station-Yuma
PO Box 99106
Yuma AZ 85369-9106

US. Fish & Wildlife Service's
Enhancement Field Office
6010 Hidden Valley Road Ste 1010
Carlsbad CA 92011

Bureau of Indian Affairs Southern
California Agency
3600 Lime Street Ste 722
Riverside CA 92501

U.S. Customs Office-Calexico
Ronald Estrada
PO Box 632
Calexico CA 92231

Naval Air Commander
PO Box 357051
San Diego CA 92135-7051

Quechan Indian Tribe
PO Box 1899
Yuma AZ 95366-1899

Cocopah Indian Tribe
County 15th & Ave G
Somerton AZ 85350

Torres Martinez Indian Tribe
PO Box 1160
Thermal CA 92274

Imperial County Applicators
304 Weed Road
Calexico CA 92231

Adams Broadwell Joseph & Cardozo
601 Gateway Blvd. Ste 1000
South San Francisco CA 94080-7037

Brawley Public Library
400 Main Street
Brawley CA 92227

Calexico City Library
850 Encinas Avenue
Calexico CA 92231

El Centro Public Library
539 State Street
El Centro CA 92243

Imperial Public Library
PO Box 38
Imperial CA 92251

Imperial County Library
1125 Main Street
El Centro CA 92243

Meyer Memorial Library
Holtville Branch
PO Box 755
Holtville CA 92250

CEO
Andy Horne, Deputy CEO
940 Main Street , 208
El Centro, Ca 92243

CEO
Jerry Santillan, Assistant CEO
940 Main Street , 208
El Centro, Ca 92243

County Counsel
Michael Rood, County Counsel
940 Main Street
El Centro, Ca 92243

City of Brawley
Garry Burroughs, City Manager
400 Main Street
Brawley, CA 92227

City of Brawley
Yazmin Arellano, Public Works
400 Main Street
Brawley, CA 92227

City of Brawley
Gordon Gaste, City Planner
400 Main Street
Brawley, CA 92227

NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR ORMAT, EAST BRAWLEY DEVELOPMENT PROJECT, ORNI. 19, LLC.

NOTICE IS HEREBY GIVEN

that the County of Imperial Planning and Development Services Department, as lead agency, is circulating for public review a Draft Environmental Impact Report (EIR) in accordance with the California Environmental Quality Act (CEQA) for the proposed ORMAT, East Brawley Geothermal Development Project, Orni 19, LLC.

Project Title:

Draft Environmental Impact Report for ORMAT, East Brawley Geothermal Development Project, Orni 19, LLC. (SCH No. 2010061054).

Project Location:

The southern boundary of the project is located north of the City of Brawley within their sphere of influence and north of Highway 111. The eastern boundary of the project is Dietrich Road and Rutherford Road is to the north. The site is comprised of parcel numbers 037-140-(006, 017, 011) -000.

Project Description:

The project would construct a new 49.9 net megawatt binary power plant composed of six Ormat Energy Converters, an expanded geothermal well field beyond the six exploration wells, and pipelines to carry the geothermal brine to the power plant. Also to be constructed are pipelines to carry the cooled brine to injection wells, pipelines to distribute non-condensable gas from production wells to the power plant area and injection wells, an electrical transmission line to interconnect to the substation at the North Brawley 1 Geothermal Power Plant, and a water pipeline to bring water from the Imperial Irrigation District canal to the power plant for cooling water.

Anticipated Significant Effects:

The EIR will analyze potential impacts associated with the following: Aesthetics; Agricultural Resources; Air Quality; Biological Resources; Cultural Resources; Cumulative Impacts; Geology/Soils; Greenhouse Gas Emissions/Climate Change; Growth-Inducing Impacts; Hazards/Hazardous Materials; Hydrology/Water Quality; Land Use/Planning; Noise; Public Services/Utilities; and, Transportation/Circulation.

Availability:

The Draft EIR/EA can be reviewed at the following location: Imperial County Planning and Development Services Department, 801 Main Street, El Centro, CA 92243.

Comments:

Written comments regarding the Draft EIR should be directed to Angelina Havens, Planner III, County of Imperial Planning and Development Services Department, 801 Main Street, El Centro, CA 92243 and must be received **no later than May 03, 2011** (public review period March 16, 2011 through May 03, 2011). A Final EIR incorporating public input will be prepared for consideration by the Imperial County Planning Commission and Board of Supervisors at a future public meeting.

Armando G. Villa, Director of Planning & Development Services Department

1035003

*Imperial Valley Press
Submitted March 20, 2011
Page B7*

PUBLIC NOTICE

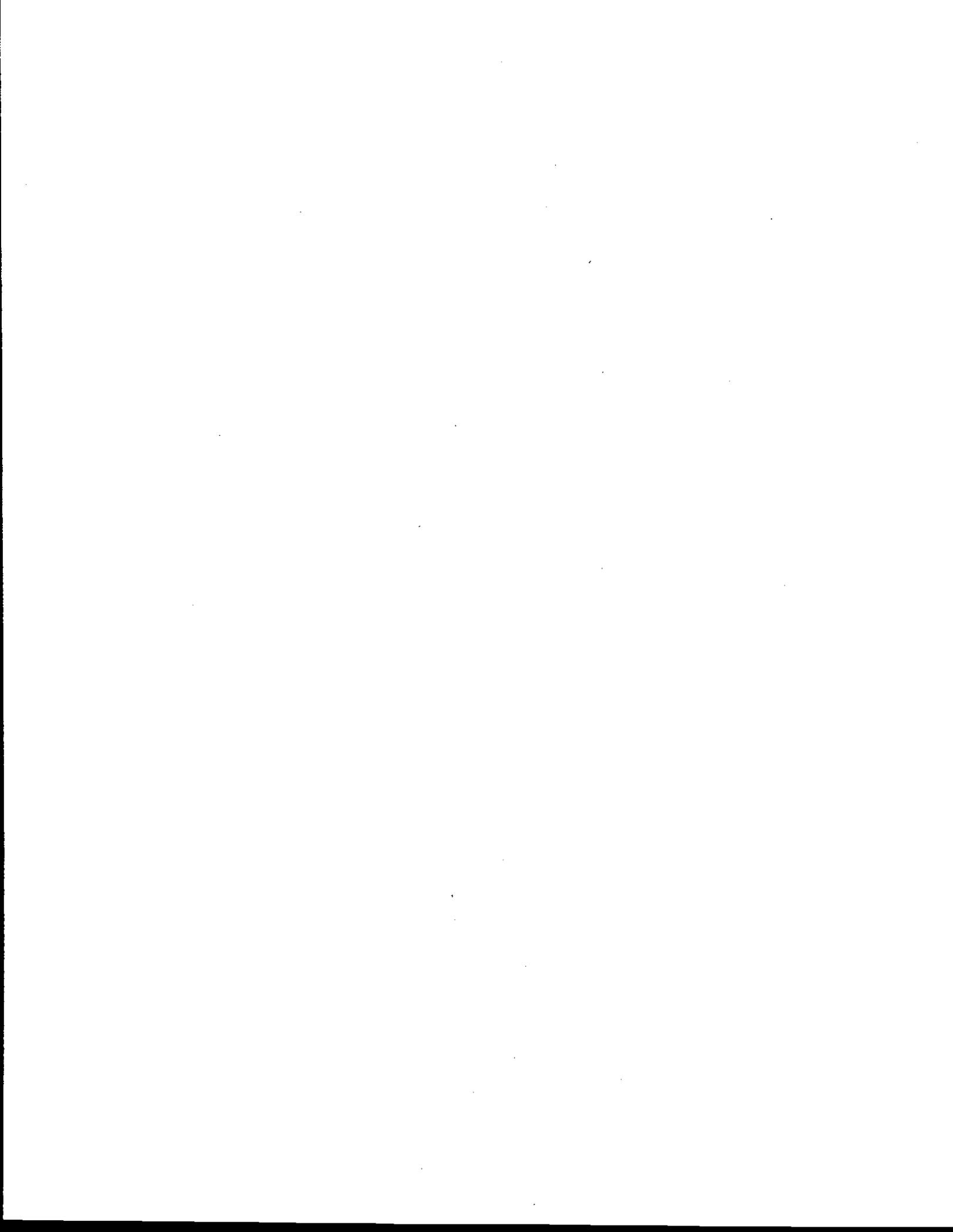
REGARDING NEGATIVE DECLARATION

The Imperial County Environmental Evaluation Committee met on **May 13, 2010**, to review the below-mentioned projects. The Committee found that the projects received a Negative Declaration. A copy of the complete project description, findings and supporting data is available for public review from 8:30 a.m. to 4:30 p.m., Monday through Friday at the Imperial County Planning & Development Services Department, 801 Main Street, El Centro, California.

(Negative Declaration) Assessment #07-0028: Ormat Nevada, Inc. (Ormat, as referenced here includes the respective subsidiaries ORNI 17, LLC and ORNI 18, LLC), are proposing to amend Conditional Use Permit #07-0017 by adding 4 injection wells permitted under Conditional Use Permit #07-0029 as amended, located on the east side of the New River for the North Brawley Geothermal Development Project (CUP #07-0017). In addition to the wells, new pipelines routes will be added, including a crossing of the New River to get the geothermal fluid from the power plant to the wells. To keep the wellfield the same size as already approved, the applicant will be removing four previously approved wells from the wellfield, so there will be no net increase to the number of wells as a result of this amendment. The subject property is identified by APN#037-130-040-001 and is legally described as Township 13 South, Range 14 East, SBB&M. (4982 Hovley Road, Brawley, CA.), (Supervisory District #4), [Angelina Havens, Planner III at (760) 482-4236 extension 4984].

JURG HEUBERGER, Chairman
Environmental Evaluation Committee

Si usted requiere esta información en español, por favor de llamar al (760) 482-4236.



COLORADO RIVER BOARD OF CALIFORNIA

770 FAIRMONT AVENUE, SUITE 100
GLENDALE, CA 91203-1068
(818) 500-1625
(818) 543-4685 FAX



July 27, 2010

RECEIVED

Mr. Scott Morgan
Acting Director
State Clearinghouse
1400 Tenth Street
P.O. Box 3044
Sacramento, CA 95812-3044

JUL 30 2010

IMPERIAL COUNTY
PLANNING & DEVELOPMENT SERVICES

Regarding: SCH# 2008 061 054: Notice of Preparation for a draft Environmental Impact Report (EIR) for the East Brawley Geothermal Development Project, County of Imperial, California

Dear Mr. Morgan:

The Colorado River Board of California (CRB) has received and reviewed a copy of Preparation for a draft Environmental Impact Report (EIR) for the East Brawley Geothermal Development Project, County of Imperial, California.

In order to be included in the draft EIR for that project, the CRB suggested that the project proponent has to obtain 1) a water services contract for the power plant cooling water and for the project construction use from the Imperial Irrigation District, 2) production wells and injection wells permit before drilling from the California Department of Water Resources, 3) permit for a Pipeline Crossing over the New River from the relevant agency, and 4) Conditional Use Permit from the Imperial County.

If you have any questions, please feel free to contact me at (818) 500-1625.

Sincerely,

A handwritten signature in cursive script that reads "G. Zimmerman".

GP
Gerald R. Zimmerman
Acting Executive Director

cc: Mr. Jurg Heuberger, Director, Imperial County Planning and Development Services
Mr. Michael King, Manager, Water Department, Imperial Irrigation District
Mr. Mark Stuart, Chief, Department of Water Resources, Southern District

Resources Agency

- Resources Agency - Nadell Gayou
- Dept. of Boating & Waterways - Mike Soleo
- California Coastal Commission - Elizabeth A. Fuchs
- Colorado River Board - Gerald R. Zimmerman
- Dept. of Conservation - Rebecca Salazar
- California Energy Commission - Eric Knight
- Cal Fire - Allen Robertson
- Central Valley Flood Protection Board - James Herola
- Office of Historic Preservation - Wayne Donaldson
- Dept of Parks & Recreation Environmental Stewardship Section
- California Department of Resources, Recycling & Recovery - Sue O'Leary
- S.F. Bay Conservation & Dev't. Comm. - Steve McAdam
- Dept. of Water Resources Resources Agency - Nadell Gayou
- Conservancy
- fish and Game
- Dept. of Fish & Game - Scott Flint
Environmental Services Division
- Fish & Game Region 1 - Donald Koch

- Fish & Game Region 1E - Laurie Harnsberger
- Fish & Game Region 2 - Jeff Drongesen
- Fish & Game Region 3 - Charles Armor
- Fish & Game Region 4 - Julie Vance
- Fish & Game Region 5 - Don Chadwick
Habitat Conservation Program
- Fish & Game Region 6 - Gabriela Gatchel
Habitat Conservation Program
- Fish & Game Region 6 I/M - Brad Henderson
Inyo/Mono, Habitat Conservation Program
- Dept. of Fish & Game M - George Isaac
Marine Region

Other Departments

- Food & Agriculture - Steve Shaffer
Dept. of Food and Agriculture
- Depart. of General Services - Public School Construction
- Dept. of General Services - Anna Garbeff
Environmental Services Section
- Dept. of Public Health - Bridgette Binning
Dept. of Health/Drinking Water

Independent Commissions/Boards

- Delta Protection Commission - Linda Flack
- Cal EMA (Emergency Management Agency) - Dennis Castrillo
- Governor's Office of Planning & Research - State Clearinghouse

- Native American Heritage Comm. - Debbie Treadway
- Public Utilities Commission - Leo Wong
- Santa Monica Bay Restoration - Guangyu Wang
- State Lands Commission - Marina Brand
- Tahoe Regional Planning Agency (TRPA) - Cherry Jacques

Business, Trans & Housing

- Caltrans - Division of Aeronautics - Sandy Hesnard
- Caltrans - Planning - Terri Pencovic
- California Highway Patrol - Scott Loetscher
Office of Special Projects
- Housing & Community Development - CEQA Coordinator
Housing Policy Division

Dept. of Transportation

- Caltrans, District 1 - Rex Jackman
- Caltrans, District 2 - Marcelino Gonzalez
- Caltrans, District 3 - Bruce de Terra
- Caltrans, District 4 - Lisa Carboni
- Caltrans, District 5 - David Murray
- Caltrans, District 6 - Michael Navarro
- Caltrans, District 7 - Elmer Alvarez

- Caltrans, District 8 - Dan Kopulsky
- Caltrans, District 9 - Gayle Rosander
- Caltrans, District 10 - Tom Dumas
- Caltrans, District 11 - Jacob Armstrong
- Caltrans, District 12 - Chris Herre

Cal EPA

Air Resources Board

- Airport Projects - Jim Lemer
- Transportation Projects - Douglas Ito
- Industrial Projects - Mike Tollstrup

- State Water Resources Control Board - Regional Programs Unit
Division of Financial Assistance

- State Water Resources Control Board - Student Intern, 401 Water Quality Certification Unit
Division of Water Quality

- State Water Resources Control Board - Steven Herrera
Division of Water Rights

- Dept. of Toxic Substances Control - CEQA Tracking Center

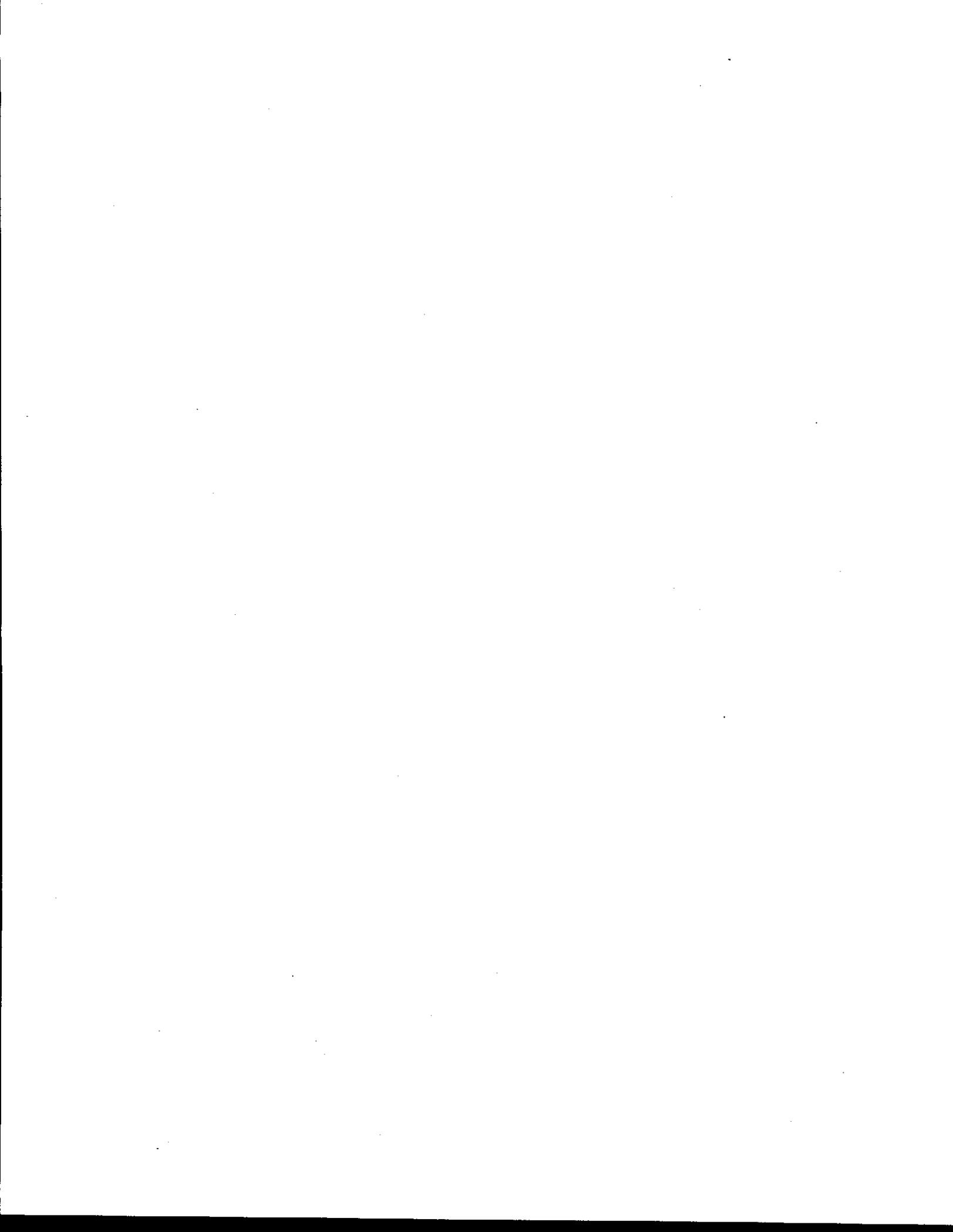
- Department of Pesticide Regulation - CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

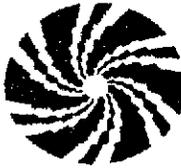
- RWQCB 1 - Cathleen Hudson
North Coast Region (1)
- RWQCB 2 - Environmental Document Coordinator
San Francisco Bay Region (2)
- RWQCB 3 - Central Coast Region (3)
- RWQCB 4 - Teresa Rodgers
Los Angeles Region (4)
- RWQCB 5S - Central Valley Region (5)
- RWQCB 5F - Central Valley Region (5)
Fresno Branch Office
- RWQCB 5R - Central Valley Region (5)
Redding Branch Office
- RWQCB 6 - Lahontan Region (6)
- RWQCB 6V - Lahontan Region (6)
Victorville Branch Office
- RWQCB 7 - Colorado River Basin Region (7)
- RWQCB 8 - Santa Ana Region (8)
- RWQCB 9 - San Diego Region (9)
- Other _____

Comments as attached

EXHIBIT 33



ORMAT®



May 12, 2008

Mr. Jurg Heuberger, Planning Director
Imperial County Planning & Development Services
801 Main Street
El Centro, CA 92243

Subject: CUP #07-0017, Request for Amendment

Dear Mr. Heuberger:

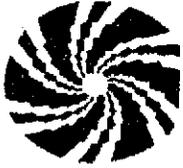
As provided for by Condition G-14 of this CUP, Ormat Nevada Inc. requests a minor amendment to Condition S-1 (a), (c), (d) and (g) for the North Brawley geothermal development project as a result of the exploration wells that were drilled and the additional leases acquired since the initial CUP application was submitted. An amended Authority to Construct application was also submitted to the Imperial County Air Pollution Control District on March 27, 2008 as a result of the flow testing performed on the exploration wells (enclosed). Ormat believes the land use changes described below are environmentally insignificant as compared to the original project description.

1. The original well field layout was based on the known resource data and the leased area. Based on additional lease acquisition the area proposed for this project is larger but the number of wells, either production or injection, remain the same. It is also planned to use well pads for more than 1 well, thus, potentially reducing the number of well pads for the project too. The well nomenclature has been changed from OB to the Kettleman system commonly used on federal lands. A revised map to the one in the CUP application and a revised Table I which shows the landowner information along with the new well names are enclosed. Conditional Use Permit application forms, Owner Affidavits and Indemnification Agreements are enclosed for the lands that were added to the project area.
2. Each production well will have a corrosion inhibitor and scale inhibitor container at their location. The container, size and type to be determined, will have secondary containment.
3. Each production well or well pad will have a gas separator to separate entrained gas from the brine. Approximately 25% of the separated gas will be sent to the power plant in a pipeline that parallels the brine pipeline. The balance of the gas will travel to injection wells in a pipeline that parallels the brine pipeline to be injected along with cooled brine from the power plant.

ORMAT Nevada

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4. Each production well will have a geothermal fluid booster pump to pump the fluid to the power plant.
5. Each production well will have a sand separator that operates occasionally to remove sand from geothermal fluid. The sand will be collected in tanks for disposal.
6. Two (2) cooling tower blowdown wells will be drilled within the power plant site, 68-17 and 68A-17.
7. The separated gas will go through a gas scrubber at the power plant. See revised power plant site plan and flow diagram. The separated gases will both vented and combined with the cooling tower blowdown for injection.
 - a. The amount of green house gases emitted, methane and carbon dioxide, are less than half of those allowed under AB 32 for new generation in California.
 - b. Hydrogen sulfide emissions will be abated in the gas scrubber to 48 lb/day using sodium hydroxide as required by the Imperial County Air Pollution Control District's (ICAPCD) Rule 207.C.1.c.
 - c. Benzene emissions will be limited to just under 50 lbs/day by combining the gases for injection with the cooling tower blowdown. We believe this meets the intent of ICAPCD Rule 207.C.1.a. for Best Available Control Technology for a nonattainment pollutants or its precursors. The benzene emissions will increase the plant's emissions of nonattainment pollutants to 187 lbs/day; thus, as required by Rule 207 C.2.a. emission offsets will be required for all emissions greater than 137 lbs/day.

Although there have been changes to the Brawley project since it's inception Ormat has strived to redesign a project that not only meets all rules and regulations but provides environmental benefit to Imperial County. The project is in construction and we hope to be commercial by the end of the year. Thank you for your consideration. Please contact me at 775-336-0155 if you have any questions or need more information.

Sincerely,

Charlene L. Wardlow

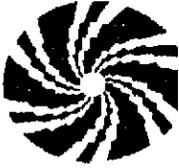
Charlene L. Wardlow
Environmental/Regulatory Affairs Administrator

Enclosures

ORMAT Nevada

6225 Neil Road, Reno, NV, 89511 • Telephone (775) 356-9029 • Facsimile (775) 356-9039

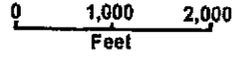
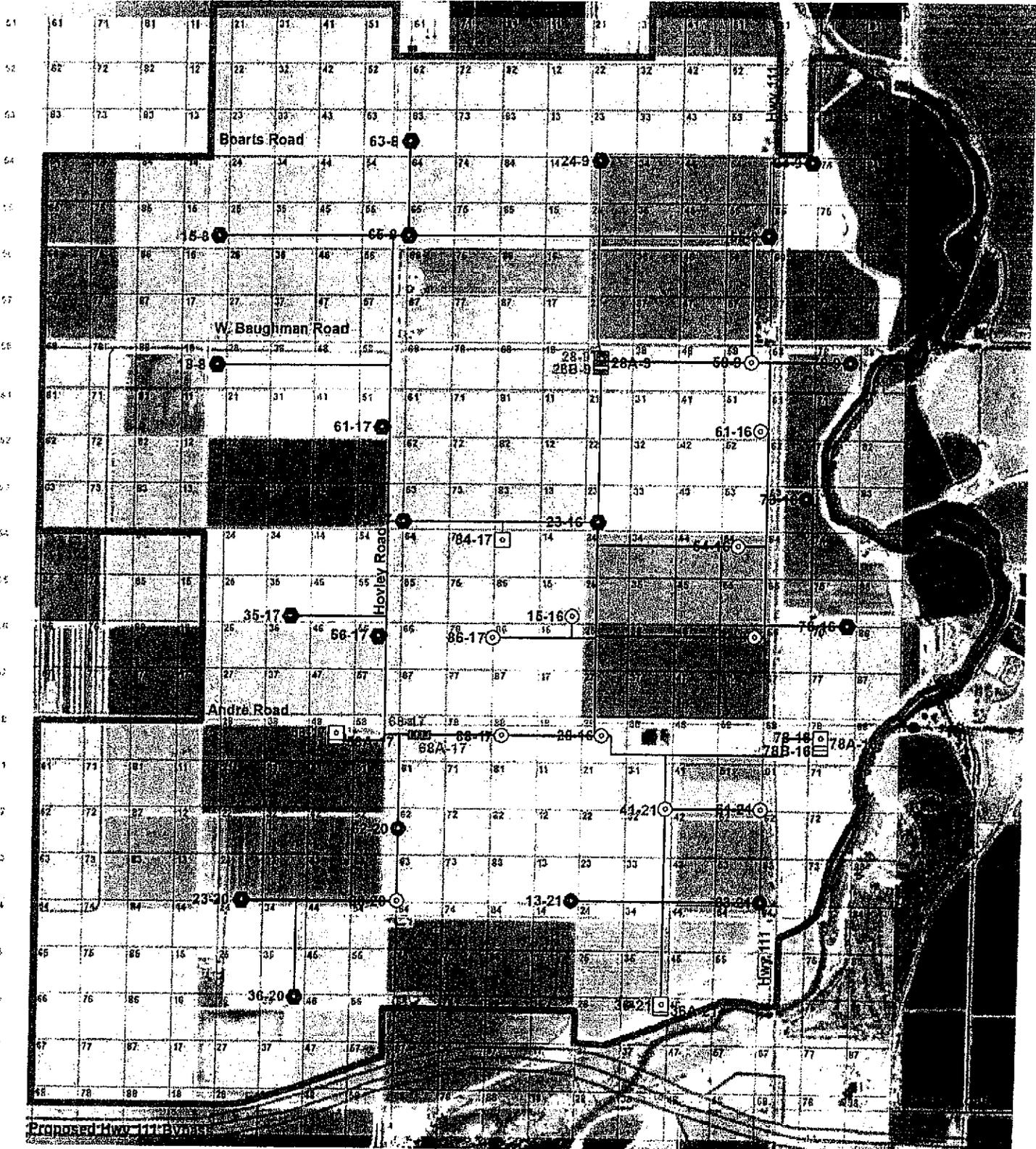
ORMAT®



cc: Brad Poiriez, Air Pollution Control District
Richard Cabanilla, Planning & Development Services
Mario Martinez, Ormat Nevada Inc.
Skip Matlick, Ormat Nevada Inc.
Bob Sullivan Ormat Nevada Inc.

ORMAT Nevada

6225 Neil Road, Reno, NV, 89511 • Telephone (775) 356-9029 • Facsimile (775) 356-9039



Project Area Extents
Shown on Figure

LEGEND

- Production Well: ●
- Injection Well: ■
- Geothermal Pipeline: +
- Proposed Production Well: ⊙
- Proposed Injection Well: □
- Proposed Production or Injection Well: ●
- Blowdown Well: ■

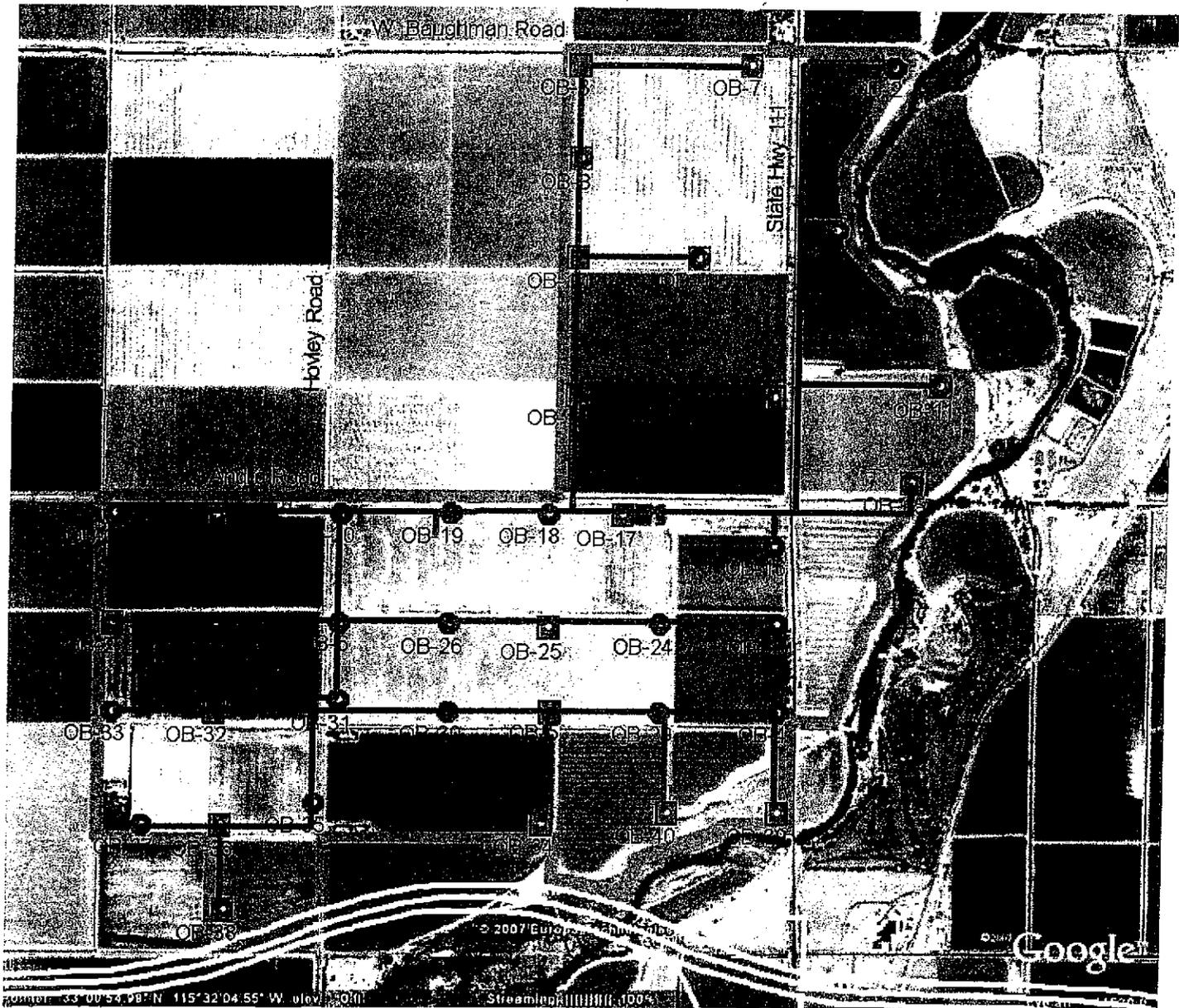


Figure 3: North Brawley Wellfield and Pipeline Systems

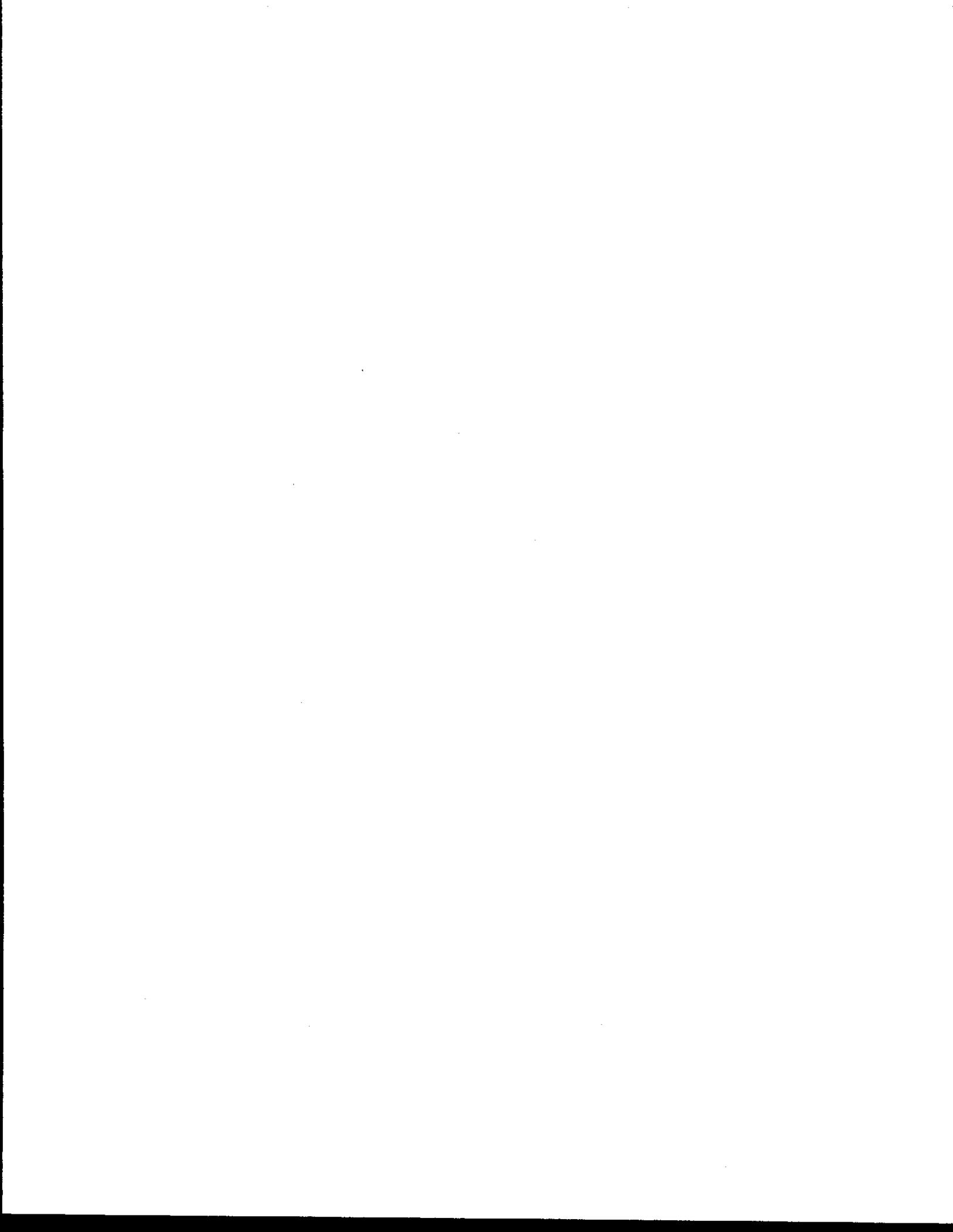
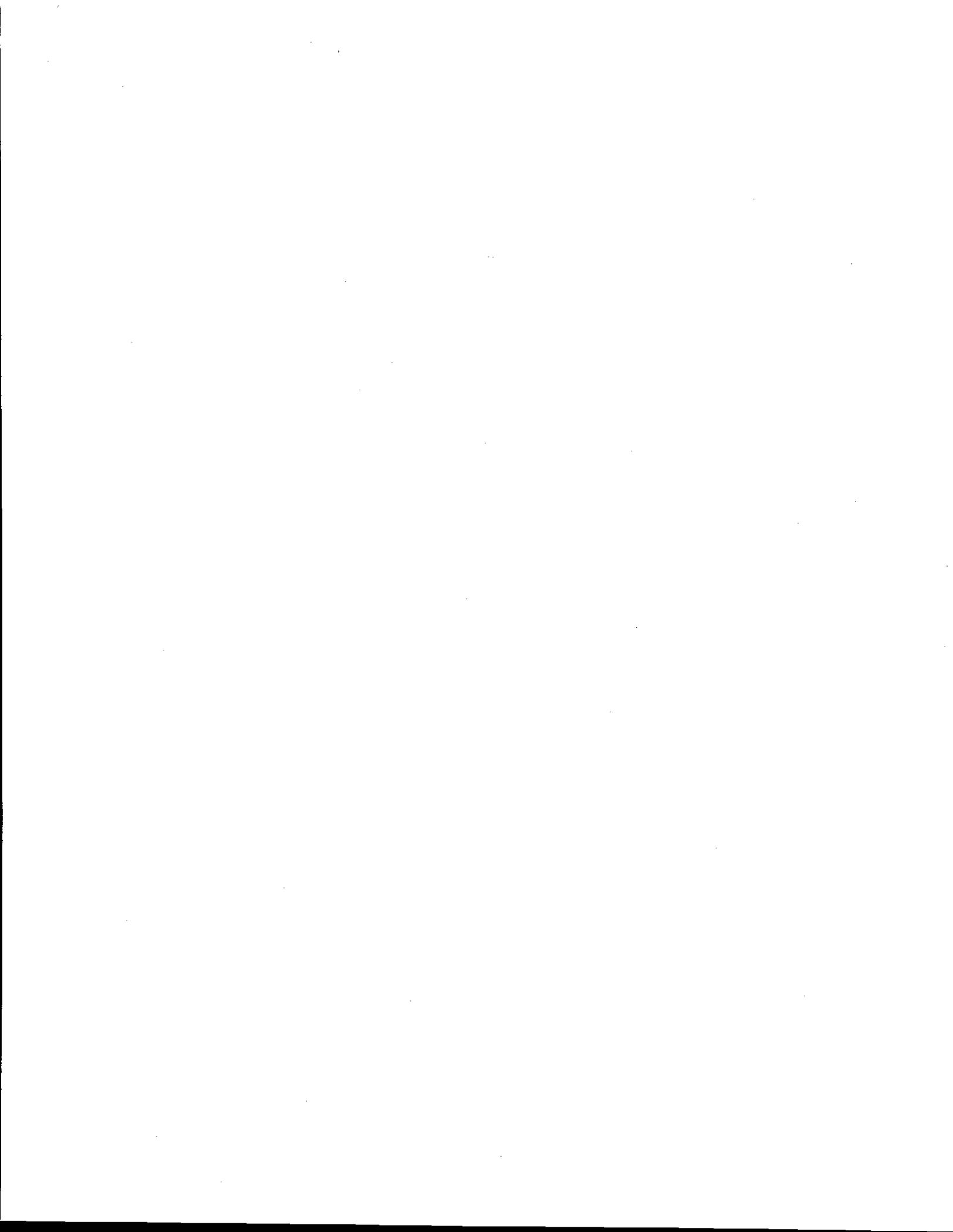


EXHIBIT 34



ORMAT®



September 14, 2010

Mr. Brad Poiriez
Air Pollution Control Officer
Imperial County Air Pollution Control District
150 S. 9th Street
El Centro, CA 92243

Subject: Revised Application for Authority to Construct for the East Brawley Geothermal Development Project

Dear Mr. Poiriez:

ORNI 19, LLC, a wholly owned subsidiary of Ormat Nevada Inc., is proposing the East Brawley Geothermal Development Project (Project or Facility), consisting of a new 49.9 MW (net) binary power plant; a geothermal well field (owned by ORNI 17, LLC and ORNI 19, LLC), consisting of a total of 34 geothermal wells; pipelines to bring the geothermal fluids produced from the production wells to the power plant and spent geothermal fluids to the injection wells for injection into the geothermal reservoir; an interconnection transmission line to the Imperial Irrigation District's existing electrical transmission system; and a water conveyance system to bring water to the power plant to provide cooling water for the power plant.

The Project is located east of the New River, and north-northeast of the City of Brawley in Imperial County, California. The approximately 15 acre power plant site (which includes the substation and storm water retention basin) is located on private agriculture lands northwest of the intersection of Best and Ward Roads, in the southeast quarter of Section 15, Township 13 South, Range 14 East, SBB&M, identified as Assessor's Parcel Number (APN) 037-140-06-01, a parcel of 32.81 acres. The geothermal well field is also located on private agricultural lands in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, SBB&M.

Ormat anticipates that construction on the project would start during the fourth quarter of 2010, with commercial start-up in late-2011.

The enclosed application replaces the Authority to Construct application originally submitted for this project on October 31, 2008 and determined complete by the ICAPCD on December 2, 2008. It consists of the completed Authority to Construct Application form; two supplemental Internal Combustion Engine Summary forms for the two emergency engines; and an attachment to the ATC Application form which provides a complete description of the proposed project, projected air pollutant emission rates, an assessment of project compliance with the ICAPCD regulations, and a health risk assessment for the noncondensable gases emitted by the scrubber. We understand that the check for the \$157.00 application processing fee submitted with the original application in 2008 will be applied to this application. If this is not correct, please let us know and we will replace or supplement this check as appropriate.

We understand that pursuant to District Rule 902, a synthetic minor permit requires a 30-day public notice and a 30-day review by the U.S. Environmental Protection Agency. We ask that the District schedule these two reviews to run concurrently, and take whatever additional steps may be possible to facilitate the timely review and approval of this permit application so that the construction of the modified facility can be initiated as soon as Imperial County approved the Conditional Use Permit for the project.

ORMAT Nevada

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ORMAT®



775-336-0173

Please call me at ~~760.351.8555~~ if you have any questions or need more information. We would also be happy to meet with you and your staff to review any aspect of the project.

Sincerely,

rleiken@ormat.com

A handwritten signature in black ink, appearing to read 'Ron Leiken', written in a cursive style.

Ron Leiken, QEP
Environmental/Regulatory Affairs Administrator

Enclosures (5)

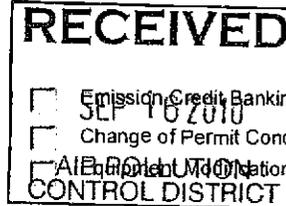
cc: Dwight Carey, EMA (w/ Enclosures)
David Levy, Ormat Nevada Inc. (w/ Enclosures)

ORMAT Nevada

6225 Neil Road, Reno, NV, 89511-1163 • Telephone (775) 356-9029 • Facsimile (775) 356-9039

150 South Ninth Street
El Centro, CA 92243
(760) 482-4606

IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT



APPLICATION FOR

- Authority to Construction
 New
 Amendment
 Permit to Operate
 Transfer of Ownership
 Relocation
 Name change

- Emission Credit Banking \$85.00
 Change of Permit Conditions
 Air Pollution Unit Addition or Addition

PERMIT NUMBER (if any)

N/A

1. Name of Applicant
ORNI 19, LLC - ORMAT NEVADA, INC.

2. Responsible Person
David Levy

3. Mailing Address
6225 Neil Road

4. Title
Project Manager

5. City State Zip Code
Reno NV 89511-1153

6. Phone (Area Code) Cell Phone (Area Code)
760.351.8555 775.376.2023

7. Type of Organization (Corp., Government, Individual, etc.)
Limited Liability Corporation - Corporation

8. Brief Description of Project/Activity
East Brawley Geothermal Development Project-49.9 MW (net) binary power plant and geothermal well field

9. Location of Project/Activity
North-northeast of the City of Brawley - Sections 10, 11, 14, 15, 16, 21, 22, and 23, T13S, R14E, SBB&M

10. Property Owner
ORNI 19, LLC (power plant site in Section 15)

11. Person in Charge at Location Title Phone Number (Area Code)
David Levy Project Manager 775.376.2023

14. Anticipated Date of Construction Start Completion
Spring 2011 Spring 2012

15. Anticipated Life of Project
30+ Years

16. Estimated Emissions	Uncontrolled lbs/day	Controlled lbs/day
For largest single pollutant ROC	416.76	154.31
Total for all emissions H2S/PM10/CO/NOx	72.62/124.31/4.41/7.14	3.93/136.31/4.41/29.89

17. Other Permits Have Been or Will be Obtained From:
ICPDS, ICPWD, CRWQCB, IID, ICDHS-EHS, CDTSC, Caltrans, CSWRCB

18. Plot plans, flow charts, calculations, equipment description and other information required by "List and Criteria" attached.

19. The information previously submitted with _____ is still valid and no changes have been made except as shown on attachment.

20. Request for confidential handling of attached.

21. Total pages attached **89**

"I am familiar with the Rules and Regulations of the Imperial County Air Pollution Control District and I certify that the operation of the plant and/or equipment which is subject to the application will comply with said Rules and Regulations."

9/15/10
Date

D. Levy
Signature of Responsible Person

OFFICE USE ONLY: All payments must be made by Check or Money Order. Cash will not be accepted Thank you.
Note: An application fee of \$157.00 is due upon submission of an application.

Date application submitted: _____ Amount paid: _____
Received by: _____ Receipt Number: _____

Staff Comments:

ATTACHMENT 1

REVISED APPLICATION FOR AUTHORITY TO CONSTRUCT

ORNI 19, LLC – ORMAT NEVADA, INC.

EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT

ATTACHMENT I
REVISED APPLICATION FOR AUTHORITY TO CONSTRUCT
ORNI 19, LLC – ORMAT NEVADA, INC.
EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT

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SYSTEM



INTERNAL COMBUSTION ENGINE SUMMARY FORM

Page 1 of 2

NOTICE

An application will not be processed unless ALL fields in "Section A" are complete.

Section A

Company/Agency ORNI 19, LLC - ORMAT NEVADA, INC.	Phone Number 760.351.8555
Equipment Location Section 15, Township 13 South, Range 14 East, SBB&M.	Existing Permit # (if any) N/A
Engine Manufacturer Caterpillar	Model Number C15
Engine Serial Number: FSE02024	EPA/C.A.R.B. 12-character Engine Family Name 7CPXL15.2ESK
Manufacturer Date: Model Year 2007	Is unit equipped with a non-resettable hour meter? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Utilization of Engine	
<input checked="" type="checkbox"/> Electrical Generator 535 Kw	<input type="checkbox"/> Fire Pump <input type="checkbox"/> Portable
<input type="checkbox"/> Compressor Driver _____ cfm	<input type="checkbox"/> Other _____
<input type="checkbox"/> Pump Driver _____ gpm	<input type="checkbox"/> Rental
Fuel Information Air to Fuel Ratio	
<input type="checkbox"/> Natural Gas <input type="checkbox"/> Gasoline <input type="checkbox"/> LPG _____ <input type="checkbox"/> Other	
<input type="checkbox"/> Digester Gas <input type="checkbox"/> Landfill Gas <input checked="" type="checkbox"/> Diesel Oil	
Engine Size (Manufacturers Rating) BHP@ 717	RPM 1800
Operating Schedule	
1 Hr/Days _____ Days/Week	
_____ Weeks/Year Maximum Operating Hours 50 hrs _____ Hrs/Days	
<input checked="" type="checkbox"/> Emergency Only (indicate hours operated for testing & maintenance)	

Section B

Is this unit designed to be moved or carried from one location to another, or does it have wheels, skids,	
<input type="checkbox"/> Yes (Portable)	<input checked="" type="checkbox"/> No (Stationary)



INTERNAL COMBUSTION ENGINE SUMMARY FORM

Page 2 of 2

Section C

Engine Description		Number of Cylinders: _____	
<input type="checkbox"/> Two Cycle	or	<input checked="" type="checkbox"/> Four Cycle	
<input type="checkbox"/> Lean Burn	or	<input type="checkbox"/> Rich Burn	
<input type="checkbox"/> Turbocharged	<input checked="" type="checkbox"/> Turbocharged/Aftercooled	<input type="checkbox"/> Naturally Aspirated	
Sulfur Content of Disgester Gas, Landfill Gas or Diesel			
CARB Diesel			
Maximum Rated Fuel Consumption (Gas/Hr, Cu. Ft/Hr) 241.7 lbs/hr			
Average Load Percentage %			
Energy Recovery From Exhaust		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No If yes, please explain
Emission Control Device		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No If yes, please explain
Emission Data:			
POLLUTANT	EMISSION BEFORE CONTROL Gr/BHP PPM Lb/Day		EMISSION AFTER CONTROL Gr/BHP PPM Lb/Day
NMHC or TOC	CARB Tier 3 Standard = NMHC+NOx=4 g/kWhr		
NOx	CARB Tier 3 Standard = NMHC+NOx=4 g/kWhr		
CO	CARB Tier 3 Standard = 3.5 g/kWhr		
PM10	CARB Tier 3 Standard = 0.20 g/kWhr		
SOx	0.0074 g/kWhr		
		<input checked="" type="checkbox"/> Manufacturer Data	<input type="checkbox"/> Source Test Data

Section D

Stationary Engines Only			
Stack Dimensions			
Height Above Grade	Approx. 10 Ft	Height Above Building	N/A Ft
Exhaust Cross Section			
Diameter	8 In	Width	N/A In
		Length	N/A In
Exhaust Temperature	942 °F	Direction of Stack Outlet	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical
			<input type="checkbox"/> Other
End of the Stack	<input type="checkbox"/> Open	<input type="checkbox"/> Capped	<input checked="" type="checkbox"/> Flapper Valve
Stack Serves			
<input checked="" type="checkbox"/> Only this equipment	Exhaust Flow	3,845	CFM
<input type="checkbox"/> Other equipment also	Total Flow Rate	3,845	CFM
	Exhaust Pressure	0 psig	CFM
Receptor Information. A receptor is a residence or business whose occupants could be exposed to toxic emissions from your facility.			
Nearest offsite receptor Home			
Distance to nearest offsite receptor	2,000	feet	
Distance to nearest school grounds	10,000	feet	

Dwight L. Carey
 Name of preparer

10/30/08
 Date



INTERNAL COMBUSTION ENGINE SUMMARY FORM

Page 1 of 2

NOTICE

An application will not be processed unless ALL fields in "Section A" are complete.

Section A

Company/Agency ORNI 19, LLC - ORMAT NEVADA, INC.	Phone Number 760.351.8555
Equipment Location Section 15, Township 13 South, Range 14 East, SBB&M.	Existing Permit # (if any) N/A
Engine Manufacturer Cummings	Model Number CFP83-F40
Engine Serial Number: 8728-6CTAAG3	EPA/C.A.R.B. 12-character Engine Family Name Not Available
Manufacturer Date: Model Year 2007	Is unit equipped with a non-resettable hour meter? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Utilization of Engine <input type="checkbox"/> Electrical Generator <u>215</u> Kw <input type="checkbox"/> Compressor Driver _____ cfm <input type="checkbox"/> Pump Driver _____ gpm	<input checked="" type="checkbox"/> Fire Pump <input type="checkbox"/> Portable <input type="checkbox"/> Rental <input type="checkbox"/> Other _____
Fuel Information <input type="checkbox"/> Natural Gas <input type="checkbox"/> Gasoline <input type="checkbox"/> Digester Gas <input type="checkbox"/> Landfill Gas	Air to Fuel Ratio _____ <input type="checkbox"/> LPG <input type="checkbox"/> Other _____ <input checked="" type="checkbox"/> Diesel Oil
Engine Size (Manufacturers Rating) BHP@ 288	RPM 1760
Operating Schedule 1 Hr/Days _____ Days/Week _____ Weeks/Year Maximum Operating Hours 50 hrs Hrs/Days	
<input checked="" type="checkbox"/> Emergency Only (indicate hours operated for testing & maintenance)	

Section B

Is this unit designed to be moved or carried from one location to another, or does it have wheels, skids, <input type="checkbox"/> Yes (Portable) <input checked="" type="checkbox"/> No (Stationary)
--



INTERNAL COMBUSTION ENGINE SUMMARY FORM

Page 2 of 2

Section C

Engine Description		Number of Cylinders: _____	
<input type="checkbox"/> Two Cycle	or	<input checked="" type="checkbox"/> Four Cycle	
<input type="checkbox"/> Lean Burn	or	<input type="checkbox"/> Rich Burn	
<input type="checkbox"/> Turbocharged	<input checked="" type="checkbox"/> Turbocharged/Aftercooled	<input type="checkbox"/> Naturally Aspirated	
Sulfur Content of Disgester Gas, Landfill Gas or Diesel			
CARB Diesel			
Maximum Rated Fuel Consumption (Gas/Hr, Cu. Ft/Hr) 14.5 gph			
Average Load Percentage %			
Energy Recovery From Exhaust		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No If yes, please explain
Emission Control Device		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No If yes, please explain
Emission Data:			
POLLUTANT	EMISSION BEFORE CONTROL Gr/BHP PPM Lb/Day		EMISSION AFTER CONTROL Gr/BHP PPM Lb/Day
NMHC or TOC	0.14 g/kWhr		
NOx	5.37 g/kWhr		
CO	0.6 g/kWhr		
PM10	0.09 g/kWhr		
SOx	0.0074 g/kWhr		
		<input checked="" type="checkbox"/> Manufacturer Data	<input type="checkbox"/> Source Test Data

Section D

Stationary Engines Only			
Stack Dimensions			
Height Above Grade	Approx. 8 Ft	Height Above Building	N/A Ft
Exhaust Cross Section			
Diameter	4 In	Width	N/A In
		Length	N/A In
Exhaust Temperature	952 °F	Direction of Stack Outlet	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical
			<input type="checkbox"/> Other
End of the Stack	<input type="checkbox"/> Open	<input type="checkbox"/> Capped	<input checked="" type="checkbox"/> Flapper Valve
Stack Serves			
<input checked="" type="checkbox"/> Only this equipment	Exhaust Flow	1.632	CFM
<input type="checkbox"/> Other equipment also	Total Flow Rate	1.632	CFM
	Exhaust Pressure	0 psig	CFM
Receptor Information. A receptor is a residence or business whose occupants could be exposed to toxic emissions from your facility.			
Nearest offsite receptor Home			
Distance to nearest offsite receptor		2,000	feet
Distance to nearest school grounds		10,000	feet

Dwight L. Carey
 Name of preparer

10/30/08 - rev 9/14/10
 Date

ATTACHMENT 1
REVISED APPLICATION FOR AUTHORITY TO CONSTRUCT
ORNI 19, LLC – ORMAT NEVADA, INC.
EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT

INTRODUCTION

ORNI 19, LLC, a wholly owned subsidiary of Ormat Nevada, Inc., (Ormat) is proposing the East Brawley Geothermal Development Project (Project or Facility), consisting of a new 49.9 MW (net) binary power plant; a geothermal well field (owned by ORNI 17, LLC and ORNI 19, LLC), consisting of a total of 34 geothermal wells; pipelines to bring the geothermal fluids produced from the production wells to the power plant and spent (cooled) geothermal fluids to the injection wells for injection into the geothermal reservoir; an interconnection transmission line to the Imperial Irrigation District's existing electrical transmission system; and a system to bring water to the power plant to provide cooling water for the power plant.

The Project is located east of the New River, and north-northeast of the City of Brawley in Imperial County, California (see Figure 1). The approximately 15 acre power plant site (which includes the substation and storm water retention basin) is located on private agriculture lands northwest of the intersection of Best and Ward Roads, in the southeast quarter of Section 15, Township 13 South, Range 14 East, SBB&M, identified as Assessor's Parcel Number (APN) 037-140-06-01, a parcel of 32.81 acres. The geothermal well field is also located on private agricultural lands in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, SBB&M (see Figure 2).

Ormat anticipates that construction on the project would start during the fourth quarter of 2010, with commercial start-up in late-2011.

The Project will be similar to the North Brawley geothermal power plant, which is currently completing startup approximately 1.75 miles to the west under Authority to Construct No. 3731A. As a result, this application follows the format of the Application for Amendment to Authority to Construct No. 3731, submitted August 11, 2008 by ORNI 18, LLC and Ormat Nevada, Inc. The well field for the East Brawley Project has filed a separate application for an amendment to Authority to Construct No. 3783 to drill and test the wells required for the East Brawley Project.

EQUIPMENT AND SYSTEM DESCRIPTIONS

The Project consists of the following proposed equipment:

- a new 49.9 MW (net) binary power plant, consisting of:
 - six 12.5 MW (gross) binary Ormat Energy Converter (OEC) Units (OEC Units 1 through 6), each with vaporizers, turbines, generators, condensers, preheaters, pumps, and piping (manufactured by Ormat Turbines Ltd.);

East Brawley Geothermal Development Project – Attachment 1
Revised Application for Authority to Construct

- two 12,000 gallon motive fluid (isopentane) storage tanks;
- integrated OEC Unit motive fluid (isopentane) vapor recovery systems on each OEC Unit condenser (manufactured by Ormat Turbines Ltd.);
- a maintenance vapor recovery unit, consisting of a diaphragm pump, a vacuum pump, and activated carbon canisters (manufactured by Ormat Turbines Ltd.);
- two film, counter-flow, induced-draft cooling towers (each with seven to ten cells), each circulating a maximum of 110,000 gpm of cooling water;
- two to four cooling water blowdown injection wells;
- a regenerative thermal oxidizer (RTO) unit (for the abatement of benzene and hydrogen sulfide in the emitted geothermal noncondensable gases) and caustic scrubber abatement system (for the abatement of sulfur oxides from the RTO oxidization of the hydrogen sulfide in the geothermal noncondensable gases);
- a control room, office, and maintenance shop;
- an electrical substation;
- a 215 kW emergency standby diesel engine fire-water pump (manufactured by Daybreak Technologies, Inc.);
- a 625 kVA/535 kW emergency standby diesel engine-generator to supply electrical power for plant auxiliaries when the plant trips (manufactured by Hawthorn Power Systems); and
- other related ancillary equipment.
- a geothermal well field, consisting of a total of 34 geothermal wells:
 - Approximately 17 geothermal fluid production wells, each about 4,500 feet deep, with associated electrically powered pumps, well pad piping, sand separators to remove sand from the produced geothermal fluid, electrical power supply, geothermal noncondensable gas separators and related ancillary equipment (tanks, valves, controls, and flow monitoring devices), and
 - Approximately 17 geothermal fluid injection wells, each about 4,500 feet deep, with associated well pad piping, a geothermal fluid filter system, electrical power supply and related ancillary equipment (tanks, valves, controls, and flow monitoring devices);
- pipelines to bring the geothermal fluids produced from the production wells to sand separators and the power plant, and the spent geothermal fluids to the injection fluid filter system and the injection wells for injection into the geothermal reservoir;
- pipelines to bring the separated noncondensable gases produced from the production wells to the power plant for processing through the RTO unit and release to the atmosphere;
- an approximately two-mile long 92 kv/13.8 kV transmission interconnection line to the North Brawley substation;
- a communication tower on the plant site to facilitate communications with a central Ormat Imperial Valley control room; and
- a water conveyance system to bring water to the power plant to provide cooling tower makeup water for the power plant.

East Brawley Geothermal Development Project – Attachment I
Revised Application for Authority to Construct

The East Brawley Project consists of four principal systems: the geothermal fluid system, the motive fluid system, the cooling water system and the geothermal noncondensable gas system (including the regenerative thermal oxidizer (RTO) unit/caustic scrubber system and the cooling tower geothermal noncondensable gas bypass). Although the geothermal fluid system and the motive fluid system are each generally closed systems, each would emit small quantities of air contaminants during normal and maintenance operations. The cooling water system and the geothermal noncondensable gas system are at least partially open to the atmosphere.

Figure 3 shows the general arrangement of the Project power plant facilities. Figure 4 and Figure 5 are basic block diagrams of the power plant, which each shows how the three separate power plant fluid systems (geothermal fluid, motive (working) fluid and cooling water) flow through each of the six OEC Units. Figure 6 shows a perspective view of one of the six OEC Units. Each of the six OEC Units would be able to operate independently of the others, but would share common ancillary components (additional working fluid storage, geothermal fluid supply and injection, etc.). Figure 7 presents the simplified process flow diagram for the geothermal noncondensable gas (NCG) system, including the high pressure NCG separator, the RTO unit/caustic scrubber system and the cooling tower bypass. Figure 8 presents the RTO unit/caustic scrubber system general arrangement – plan and elevation views, while Figure 9 presents the RTO unit/caustic scrubber system mass flow diagram.

Geothermal resources required to provide heat energy to the power plant would be supplied from a total of approximately 17 geothermal production wells (see Figure 2). Each production well would be equipped with a pump driven by a vertical electric motor located on top of the well pump discharge head and corrosion and scale inhibitor systems to deliver corrosion and scale inhibitors into the geothermal fluid. An electric cable installed along the production pipeline from the power plant would provide the electricity to power the well pump motor.

Each of the production wells would deliver geothermal fluid to the power plant through production pipelines. The geothermal fluids would first flow from the production wells through closed, high pressure well pad separators which would separate most of the geothermal noncondensable gases from the geothermal brine (see Figure 7). If the quantity of geothermal noncondensable gases in the geothermal fluid is less than the high end of the possible range, all of these separated geothermal noncondensable gases would flow through other dedicated pipelines to the power plant site, to be dissolved/entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. Small quantities of these separated geothermal noncondensable gases would be discharged to the atmosphere along the dedicated pipelines as condensate created as the steam cools is drained from the pipeline.

However, if the quantity of geothermal noncondensable gases in the geothermal fluid is at the high end of the possible range, up to twenty-five percent of these separated geothermal noncondensable gases would flow through other dedicated pipelines to the RTO unit/caustic scrubber system located at the power plant site. The remaining seventy-five percent of the separated geothermal noncondensable gases would flow through the dedicated pipelines to be dissolved/entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. As described above, small quantities of these separated geothermal noncondensable gases

East Brawley Geothermal Development Project – Attachment 1
Revised Application for Authority to Construct

would be discharged to the atmosphere along the dedicated pipelines as condensate created as the steam cools is drained from the pipeline.

The geothermal brine and the geothermal noncondensable gases remaining in the geothermal brine would then flow through sand separators at each well pad to remove sand and other debris from the produced geothermal fluid. These sand separators would discharge a small amount of geothermal fluid and accompanying geothermal noncondensable gases when purging the sand. The produced geothermal fluid would then proceed through booster pumps and the geothermal fluid pipelines to the power plant site, through additional sand separators, then through the OEC units. The spent geothermal fluid would then run through an injection fluid filtrations system and into the geothermal injection wells without coming into direct contact with the motive fluid or the atmosphere. The geothermal injection fluid filtration system would also discharge a small amount of geothermal fluid and accompanying geothermal noncondensable gases when purging the filtered sand.

The produced geothermal fluid would flow through the level 1 and level 2 vaporizers and preheaters of each OEC Unit, transferring the heat to the motive (working) fluid through the OEC Unit shell-and-tube heat exchangers. Injection pumps located at the power plant site would pump the geothermal injection fluid through the injection pipeline system, providing sufficient pressure to inject the cooled geothermal fluid back into the geothermal reservoir through the approximately 17 injection wells.

The Project would use isopentane as the motive (working fluid). The pressure of the isopentane working fluid vaporized from each OEC Unit level 1 and level 2 vaporizers would turn each OEC Unit level 1 and level 2 turbine, which together would turn a common generator, which would produce the electrical energy which would be delivered to the existing IID electrical transmission systems through the North Brawley substation. The isopentane vapor exiting each turbine would be condensed back into a liquid in a shell-and-tube condenser and returned to the preheaters and vaporizers to repeat the essentially closed cycle.

Each OEC Unit would contain approximately 23,000 gallons of isopentane (in the vaporizers, preheaters, condensers and piping). Each OEC Unit would have minor leaks of isopentane from the valves, connections, seals, and tubes which would be released either to the atmosphere or into the geothermal fluid or circulating cooling water lines. Power plant operators would frequently inspect and monitor the OEC Units for isopentane leaks and visual signs of fugitive isopentane emissions.

Small amounts of air or water vapor typically leak into the OEC Unit isopentane system in the condensers and would eventually reduce the operating efficiency of the OEC Unit unless removed. In order to remove these noncondensable gases, each OEC condenser would have a small (~0.106 scf) "OEC vapor recovery unit" (OEC VRU) integrated into the condenser. Each OEC VRU would consist of two chambers and a set of isolation valves. Operation of each OEC VRU would be controlled by the power plant computer control system, which would start the OEC VRU noncondensable gas "purge" sequence whenever the efficiency of the OEC Unit fell below a set point. During "purging," nearly all of the isopentane vapors in the OEC VRU would be compressed into liquid isopentane and returned to the OEC Unit, while the noncondensable

East Brawley Geothermal Development Project – Attachment I
Revised Application for Authority to Construct

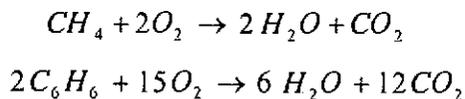
gases, together with a small quantity of isopentane vapors, would be discharged to the atmosphere.

Some OEC Unit major maintenance activities require that at least a portion of an OEC Unit be cleared of isopentane liquid and vapors prior to performing the maintenance activities. To control and minimize isopentane emissions during these infrequent major maintenance activities, the liquid isopentane would first be drained from the section of the OEC Unit (preheater, vaporizer or condenser) to be maintained or repaired and transferred to either another section of the OEC Unit, the isopentane storage tanks, or another OEC Unit. The Maintenance VRU diaphragm pump and vacuum pump would then be used to evacuate and compress most of the remaining isopentane vapors, returning the isopentane liquid to the other sections of the OEC Unit, the isopentane storage tanks, or another OEC Unit. Those isopentane vapors which do not condense would be released to the atmosphere through the Maintenance VRU activated carbon canisters, which would adsorb nearly all of the remaining isopentane vapors.

The shell-and-tube isopentane vapor condensers would be cooled by water circulated from the two cooling towers. Water from the condensers would be cooled in the cooling towers through evaporation of a portion of the circulating cooling water as the water falls through the air drawn into the cooling towers by the cooling tower fans atop each cooling tower cell. A much smaller portion of the circulating cooling water would also be lost as water droplets (“drift”) through the top of the cooling tower cells. The cooling towers would be constructed with high efficiency drift eliminators to reduce the quantity of emitted drift. Some of the circulating cooling water would also be injected into the geothermal reservoir with the geothermal injection fluid or through one or more dedicated blowdown injection wells to remove dissolved salts which would be concentrated in the cooling water through the evaporation process. Water would be added to the cooling tower to make up for the water lost through evaporation, drift and blowdown.

The up-to-twenty-five percent of the geothermal noncondensable gases separated at each of the well pads would be delivered through dedicated noncondensable gas pipelines to the RTO unit/caustic scrubber system located at the power plant site (see Figure 7). The proposed RTO unit would receive the noncondensable gases from the noncondensable gas pipelines. These gases are expected to contain sufficient hydrocarbons and oxygen (with supplemental air and a small amount of propane) to support complete combustion once the RTO unit combustion chamber reached the design operating temperatures (about 1500°F). Propane would also be used to pre-heat the RTO unit during cold start-ups and supplement the heat values of the combustible gases.

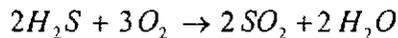
The RTO unit would oxidize the hydrocarbons in the NCGs and supplemental propane to carbon dioxide and water vapor in an exothermic process. Methane is the hydrocarbon in largest concentration in the noncondensable gas delivered to the RTO unit, with benzene being second. The following equations show the conversion of methane and benzene to water and carbon dioxide:



East Brawley Geothermal Development Project – Attachment I
Revised Application for Authority to Construct

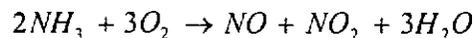
The RTO unit would combust and abate at least 98 percent of the benzene, methane and other hydrocarbons in the NCGs it receives. It is considered Best Available Control Technology (BACT) for the abatement of hydrocarbons and volatile organic gases in a wide variety of applications.

The RTO unit would also oxidize at least 98 percent of the hydrogen sulfide in the NCGs delivered to the RTO unit. The oxidation of hydrogen sulfide in the RTO unit would produce sulfur dioxide (SO₂) and water vapor in the following reaction:



The resulting SO₂ emissions would be controlled by the caustic scrubber (see below).

The low temperature combustion in the RTO unit, around 1500°F, is flameless and would thus not create appreciable nitrogen oxides (NO_x) from the oxidation of atmospheric nitrogen. The oxidation of essentially 100 percent of the ammonia contained in the NCGs by the RTO unit, however, would result in the formation of nitrogen oxides, in the following general reaction:



The RTO unit would oxidize the hydrocarbons in an average of about 5,600 standard cubic feet per minute (scfm) (28,100 lbs/hr) of NCGs using approximately 3,900 scfm (17,400 lbs/hr) of dilution air and up to 5.5 gallons (500,000 btu) per hour of propane. In the RTO unit the NCGs and dilution air enter the oxidation chamber through a hot, porous, ceramic heat-transfer media which heats the gas (see Figure 9). The heat generated by the oxidation of the NCGs and propane in the oxidization chamber sustains the oxidation process. These heated gases exit the oxidation chamber through a second porous, ceramic heat-transfer media which is heated by the exiting gases. Poppet control valves would reverse the direction of the gas flow at regular intervals to maintain an even distribution of temperatures between the two ceramic media.

The proposed caustic scrubber would receive the carbon dioxide, water vapor, sulfur dioxide, nitrogen oxides and other gases produced from the oxidation process in the RTO unit (as well as the gases passing through the RTO unit unoxidized). Before entering the caustic scrubber, the hot gases would be cooled through a direct contact quenching process. The quenched gases would then proceed to the caustic scrubber, where they would be subjected to counter-flows of caustic absorbate (water and sodium hydroxide). The caustic absorbate would react with the sulfur oxides in the quenched gases to produce sodium sulfates and sulfites, both water-soluble compounds that would be dissolved in the caustic scrubber water and piped to a storage sump at the bottom of the scrubber. The remaining gases from the RTO unit would be vented out the top of the caustic scrubber through a 30-foot tall stack. The small quantity of spent absorbate would be drained from the storage sump and piped to one of the cooling towers. Fresh absorbate would be added as needed to make up for the loss of exhausted absorbate. The caustic scrubber would remove at least 97.5 percent of the sulfur oxides in the gases it receives. It is considered BACT for the control of sulfur dioxide.

A control panel with a programmable logic controller would be used to provide monitoring and control of the RTO unit/caustic scrubber system. RTO unit/caustic scrubber system scheduled

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maintenance would be coordinated with the maintenance schedule for the East Brawley power plant, such that the East Brawley power plant would operate no more than 276 hours per year without the RTO unit/caustic scrubber system. When the RTO unit/caustic scrubber system is undergoing unscheduled maintenance or otherwise not operating, the geothermal NCGs would bypass the RTO unit/caustic scrubber system and would be delivered to the cooling towers for release to the atmosphere unabated.

APPLICABLE REGULATIONS

The following Imperial County Air Pollution Control District (ICAPCD) regulations apply to the proposed Project.

Rule 201 Permits Required

Except as exempted, new or modified sources which may emit or control air contaminants must obtain written authorization from the ICAPCD prior to construction.

Rule 206 Processing of Applications

Rule 206.A.4.c provides that the Air Pollution Control Officer shall take reasonable steps to insure that no Project will emit air contaminants that may endanger the short or long term health, safety or property of Persons.

Rule 207 New and Modified Stationary Source Review

Rule 207 limits the permitted increases of air pollutants that could interfere with the attainment or maintenance of ambient air quality standards.

- Rule 207.C.1.a requires Best Available Control Technology (BACT) for equipment with the potential to emit 25 pounds per day or more of any nonattainment pollutant or its precursors. (Ozone and fine particulate matter (PM10) are nonattainment pollutants in Imperial County, and reactive organic compounds [ROCs, which are most hydrocarbons], nitrogen oxides [NOx] and sulfur oxides [SOx] are precursors to ozone [ROCs] and PM10 [ROCs, NOx and SOx].)
- Rule 207.C.1.c requires Best Available Control Technology (BACT) for equipment with the potential to emit 55 pounds per day or more of hydrogen sulfide or the potential to emit 550 pounds per day or more of carbon monoxide (CO) in attainment areas.
- Rule 207.C.2.a requires offsets for all emissions of ROCs, PM10 and other nonattainment pollutants from a source that exceed 137 pounds per day.
- Rule 207.C.f allows the Air Pollution Control Officer to exempt equipment from the requirements of Rule 207.C.2. if used exclusively as emergency standby equipment for non-utility electrical power generation and not used in conjunction with any utility voluntary demand reduction program, provided that operation for maintenance purposes shall be limited to 100 hours per year, and operation for other than maintenance purposes shall be limited to Actual Interruptions of Power by the serving utility.

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- Rule 208 Permit to Operate
- The ICAPCD may inspect and evaluate the new equipment prior to allowing the project to operate under its Permit to Operate.
- Rule 216 Construction or Reconstruction of Major Stationary Sources that Emit Hazardous Air Pollutants
- Requires stationary sources of hazardous air pollutants to install best available control technology for toxics (T-BACT) to any constructed major source.
- Rule 400 Fuel Burning Equipment – Oxides of Nitrogen
- This rule requires that the discharge of NO_x from fuel burning equipment not exceed 140 lb/hour. Rule 400 also requires that all fuel burning equipment demonstrate compliance through compliance testing once every 12 months, except that equipment that operates less than 100 hours per 12 month period and emits less than 5 tons NO_x shall be tested not less than every 36 months.
- Rule 401 Opacity of Emissions
- The opacity of the emissions for the new source, other than uncombined water vapor, may not be as dark or darker as designated as No. 1 on the Ringlemann Chart (20% opacity) for more than 3 minutes in an hour.
- Rule 403 General Limitations on the Discharge of Air Contaminants
- The limitation in Rule 403 establishes maximum emission rates for particulate matter that vary according to the weight of the materials processed and maximum rates for the discharge of air contaminants that vary according to the volume of dry gases discharged.
- Rule 405 Sulfur Compounds Emission Standards, Limitations and Prohibitions
- Rule 405 prohibits the discharge into the atmosphere emissions of sulfur compounds, calculated as sulfur dioxide, in excess of 0.2 percent by volume, measured at the point of discharge.
- Rule 800-805 Fugitive Dust Requirements for Control of Fine Particulate Matter (PM₁₀)
- These rules control fugitive dust emissions from construction and earthmoving activities, from carry out and track out, from open areas, and paved and unpaved roads.
- Rule 900 Procedures for Issuing Permits to Operate for Sources Subject to Title V of the Federal Clean Air Act Amendments of 1990
- Sources subject to Rule 900 include major sources. Rule 900.B.20 defines “major source” as a stationary source which has the potential to emit a regulated air

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pollutant or a hazardous air pollutant (HAP) in quantities equal to or exceeding the lesser of any of the following thresholds:

- 100 tons per year (tpy) of any regulated air pollutant;
- 10 tpy of one HAP or 25 tpy of two or more HAPs; or
- Any lesser quantity threshold promulgated by the U.S. EPA.

Rule 902 Request for Synthetic Minor Source Status

This rule authorizes the owners or operators of specified stationary sources that would otherwise be major sources (pursuant to Rule 900) to request and accept federally-enforceable emissions limits sufficient to allow the sources to be considered “synthetic minor sources.”

Rule 1101 New Source Performance Standards (NSPS)

Rule 1101 adopts by reference and incorporates the provisions of Part 60, Chapter I, Title 40 of the Code of Federal Regulations (40 CFR Part 60) into the Rules and Regulations of the Imperial County Air Pollution Control District, and incorporates in its entirety Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

40 CFR Part 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines) applies to only stationary diesel engines which were ordered after July 11, 2005 and were manufactured after April 1, 2006 (if not a fire water pump engine) or after July 1, 2006 (if a fire water pump engine). Owners and operators of stationary emergency diesel engines of 2007 model year and later subject to 40 CFR Part 60, Subpart IIII must:

- Comply with the emission standards for new nonroad diesel engines in 40 CFR 60.4202, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary diesel engines;
- Operate and maintain the diesel engines according to the manufacturer’s written instructions over the entire life of each engine;
- Use fuel which meets the minimum standards set forth in the regulations;
- Install a non-resettable hour meter prior to startup of each engine;
- Limit maintenance checks and readiness testing of each engine to 100 hours per year (there is no time limit on the use of an emergency engine in emergency situations); and

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- Keep records of the operation of each engine in emergency and non-emergency service that are recorded through the non-resettable hour meter, including recording the time of operation of each engine and the reason each engine was in operation during that time.

Rule 1002 California Airborne Toxic Control Measures (ATCM)

These regulations adopt the following California Code of Regulations (CCR) titles applicable to the proposed project:

Section 93114 – Standards for Non-vehicular Diesel Fuel

Requires 15 ppm sulfur diesel fuel for use in all non-vehicular engines except locomotives and marine engines.

Section 93115 – Airborne Toxic Control Measures (ATCM) for Stationary Compression Ignition Engines.

Requires that new stationary emergency standby diesel-fueled engines >50 hp that operate no more than 50 hours per year for maintenance and testing emit diesel PM at a rate less than or equal to 0.15 g/bhp-hr and meet the standards for off-road engines in Title 13, CCR Section 2423. The ATCM does not limit emissions during emergency use and compliance testing. Lower emissions rates for PM apply to engines that operate between 50 and 100 hours per year.

Rule 1003 Hexavalent Chromium Emissions from Cooling Towers

Rule 1003 applies to all cooling towers. Since the new cooling tower cells will be made of reinforced fiberglass and not wood and since additives containing hexavalent chromium will not be used at the site, the facilities will be eligible for exemption from testing requirements.

POTENTIAL TO EMIT AND ABATED EMISSIONS FROM PROJECT OPERATIONS

Project operations would create sources of:

- hydrogen sulfide (H₂S), ROCs (including benzene (C₆H₆)) and hazardous air pollutant (HAP) (C₆H₆) emissions from the geothermal noncondensable gases through the plant noncondensable gas system (the RTO unit/caustic scrubber system and the cooling tower bypass), the noncondensable gas pipeline condensate drains, the sand separators and the geothermal injection fluid filter system;
- ROCs (isopentane) from the OEC Units, the OEC VRUs and the Maintenance VRU;
- particulates from the cooling towers; and
- NO_x, SO₂, ROCs, CO, and/or PM from the RTO unit/caustic scrubber system, the emergency standby diesel generator engine and the emergency standby fire pump diesel engine.

Geothermal Noncondensable Gas System

Engineering estimates of the up to twenty-five percent of the high end quantity of the geothermal noncondensable gases in the produced geothermal fluid which would be delivered from the high pressure separator are about 28,100 lbs/hr, based on flow testing of the North Brawley Project wells conducted during 2007 and 2008. Approximately 99.97 percent of these gases would be carbon dioxide, methane, argon and nitrogen, with the remainder consisting principally of C₆H₆, H₂S and ammonia. Table 1 lists the hourly, daily and annual potential to emit for these gases from the high pressure separator (see also Figure 7 and APPENDIX A).

Table 1: Noncondensable Gas Potential to Emit from the High Pressure Separator

Pollutant	POTENTIAL TO EMIT		
	(lb/hr)	(lbs/day)	(tons/yr)
Benzene	11.16	267.81	48.88
Hydrogen Sulfide	2.92	70.09	12.79
Methane	365.58	8773.94	1601.24
Ammonia	0.35	8.42	1.54

For most of the hours the East Brawley power plant is operating (equivalent to operating 8,484 hours per year (353.5 days per year) if the power plant operates 8,760 hours per year (365 days per year)) these NCGs would be delivered to the RTO unit/caustic scrubber system. The RTO unit would remove by thermal oxidation essentially all of the ammonia and a minimum of 98 percent of the CH₄, C₆H₆ and H₂S in the geothermal noncondensable gases delivered to the RTO unit. The oxidation of the hydrocarbons in the NCG would produce only water vapor and carbon dioxide. The oxidization of hydrogen sulfide by the RTO unit would produce sulfur dioxide at the ratio of the molecular weights of sulfur dioxide (64.06) to hydrogen sulfide (34.08). The oxidization of ammonia by the RTO unit would produce nitrogen oxides. Conservatively assuming that all of the nitrogen oxides are nitrogen dioxide, oxidization of the ammonia in the NCG by the RTO unit would produce nitrogen dioxide at the ratio of the molecular weights of nitrogen dioxide (45.99) to ammonia (17.03). Table 2 lists the maximum

hourly and daily abated air pollutant emissions from the RTO unit based on the NCG vent stack inlet rates to the RTO unit and the RTO unit control efficiencies.

Table 2: Maximum Hourly and Daily Abated Air Pollutant Emission Rates from Oxidation of the NCGs in the RTO Unit/Caustic Scrubber System

Pollutant	Inlet Rates (lb/hr)	Minimum RTO Control Efficiency	Caustic Scrubber Inlet Rates (lb/hr)	Minimum Caustic Scrubber Control Efficiency	Exhaust Gas Emission Rates	
					(lb/hr)	(lb/day)
Benzene (ROC)	11.159	98.00%	0.223	0.00%	0.223	5.36
Hydrogen Sulfide	2.920	98.00%	0.058	0.00%	0.058	1.40
Methane	365.581	98.00%	7.312	0.00%	7.312	175.48
Ammonia	0.351	100.00%	0.000	0.00%	0.000	0.00
Sulfur Dioxide	0.000	0.00%	5.380	97.50%	0.134	3.23
Nitrogen Oxides	0.000	0.00%	0.948	0.00%	0.948	22.75
PM10	0.000	0.00%	0.000	0.00%	0.500	12.00

The caustic scrubber would remove a minimum of 97.5 percent of the SO₂ created in the RTO unit, but would also create PM₁₀ emissions. These PM₁₀ emissions from the caustic scrubber would be generated from the dissolved solids in the small amount of caustic scrubbing liquid entrained in the gases emitted from the caustic scrubber stack. Table 2 also lists the maximum hourly and daily abated air pollutant emissions from the caustic scrubber stack based on the outlet from the RTO unit and the caustic scrubber system control efficiency.

Up to 0.5 MMbtu/hr of propane would be burned to supplement the heat in the RTO unit oxidation chamber from the oxidation of the NCGs. Table 3 lists the maximum hourly and daily abated air pollutant emissions from the RTO unit/caustic scrubber system from the combustion of the propane only. Table 4 lists the total maximum hourly and daily abated air pollutant emissions from the RTO unit/caustic scrubber system by adding the NCG oxidation and abatement emissions listed in Table 2 and the propane oxidation and abatement emission from Table 3.

Table 3: Maximum Hourly and Daily Abated Air Pollutant Emission Rates from Propane Combustion for the RTO Unit/Caustic Scrubber System

Pollutant	Inlet Rates (lb/hr)	Minimum RTO Control Efficiency	Caustic Scrubber Inlet Rates (lb/hr)	Minimum Caustic Scrubber Control Efficiency	Exhaust Gas Emission Rates	
					(lb/hr)	(lb/day)
Sulfur Dioxide	0.000	0.00%	0.000	97.50%	0.000	0.00
Nitrogen Oxides	0.000	0.00%	0.077	0.00%	0.077	1.86
PM10	0.000	0.00%	0.002	0.00%	0.002	0.05
Carbon Monoxide	0.000	0.00%	0.010	0.00%	0.010	0.25
Propane ROCs	23.425	100.00%	0.000	0.00%	0.000	0.00

Table 4: Total Maximum Hourly and Daily Abated Air Pollutant Emission Rates from the RTO Unit/Caustic Scrubber System

Pollutant	Inlet Rates (lb/hr)	Minimum RTO Control Efficiency	Caustic Scrubber Inlet Rates (lb/hr)	Minimum Caustic Scrubber Control Efficiency	Exhaust Gas Emission Rates	
					(lb/hr)	(lb/day)
Benzene (ROC)	11.159	98.00%	0.223	0.00%	0.223	5.36
Hydrogen Sulfide	2.920	98.00%	0.058	0.00%	0.058	1.40
Methane	365.581	98.00%	7.312	0.00%	7.312	175.48
Ammonia	0.351	100.00%	0.000	0.00%	0.000	0.00
Sulfur Dioxide	0.000	0.00%	5.380	97.50%	0.135	3.23
Nitrogen Oxides	0.000	0.00%	1.025	0.00%	1.025	24.61
PM10	0.000	0.00%	0.002	0.00%	0.502	12.05
Carbon Monoxide	0.000	0.00%	0.010	0.00%	0.010	0.25
Propane ROCs	23.425	100.00%	0.000	0.00%	0.000	0.00

The annual emissions of the NCG-related air pollutants delivered to the power plant from the high-pressure separators or processed through the RTO unit/caustic scrubber system are the sum of the annual emissions when the RTO unit/caustic scrubber is operating and the annual emissions when the RTO unit/caustic scrubber is not operating. The maximum annual emissions for each power plant NCG-related air pollutant is calculated in Table 5 using RTO unit/caustic scrubber system operations of 8,484 hours (8,760 hours – 276 hours) (353.5 days) per year.

Table 5: Maximum Annual Air Pollutant Emission Rates from the Geothermal Noncondensable Gas System

Pollutant	RTO Not Operating			RTO Operating			Total (tons/yr)
	(lb/day)	(days/yr)	(tons/yr)	(lb/day)	(days/yr)	(tons/yr)	
Benzene (ROC)	267.81	11.50	1.54	5.36	353.50	0.95	2.49
Hydrogen Sulfide	70.09	11.50	0.40	1.40	353.50	0.25	0.65
Methane	8,773.94	11.50	50.45	175.48	353.50	31.02	81.47
Ammonia	8.42	11.50	0.05	0.00	353.50	0.00	0.05
Sulfur Dioxide	0.00	11.50	0.00	3.23	353.50	0.57	0.57
Nitrogen Oxides	0.00	11.50	0.00	24.61	353.50	4.35	4.35
PM10	0.00	11.50	0.00	0.50	353.50	0.09	0.09
Carbon Monoxide	0.00	11.50	0.00	0.25	353.50	0.04	0.04
Pentane ROCs	0.00	11.50	0.00	0.50	353.50	0.09	0.09

Sand Separators

The Project would release up to 125 gallons of separated geothermal brine containing up to 1.1 ppm of hydrogen sulfide, 5.6 ppm benzene and 141.8 ppm ammonia gases from each of the approximately 46 well pad and power plant sand separators up to twelve times per day. Conservatively assuming that half (23) of the 46 sand separators would discharge during the same hour, the hourly potential to emit for H₂S, benzene, ROCs and ammonia is as shown in Table 6. With twelve discharges per day, 365 days per year, the daily and annual potential to emit are as shown in Table 7 and Table 8, respectively (see also APPENDIX A).

Table 6: Balance of Power Plant Hourly Potential to Emit

Emission Source	Potential to Emit (lbs/hr)				
	H2S	PM10	ROC	C6H6	NH3
Sand Separators NCG Emissions	0.10	0.00	0.52	0.52	13.04
Injection Filters NCG Emissions	0.01	0.00	0.04	0.04	0.91
NCG Pipeline Condensate Drains Emissions	0.00	0.00	0.00	0.00	0.02
North Cooling Tower Emissions	0.00	2.58	0.00	0.00	0.00
South Cooling Tower Emissions	0.00	2.58	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	87.04	0.00	0.00
Plant Source Total:	0.11	5.17	87.60	0.56	13.97

Table 7: Balance of Power Plant Daily Potential to Emit

Emission Source	Potential to Emit (lbs/day)				
	H2S	PM10	ROC	C6H6	NH3
Sand Separators NCG Emissions	2.47	0.00	12.46	12.46	313.08
Injection Filters NCG Emissions	0.06	0.00	0.29	0.29	7.26
NCG Pipeline Condensate Drains Emissions	0.00	0.00	0.02	0.02	0.49
North Cooling Tower Emissions	0.00	62.02	0.00	0.00	0.00
South Cooling Tower Emissions	0.00	62.02	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	136.00	0.00	0.00
Plant Source Total:	2.53	124.03	148.77	12.77	320.83

Table 8: Balance of Power Plant Annual Potential to Emit

Emission Source	Potential to Emit (tons/yr)				
	H2S	PM10	ROC	C6H6	NH3
Sand Separators NCG Emissions	0.45	0.00	2.27	2.27	57.14
Injection Filters NCG Emissions	0.01	0.00	0.05	0.05	1.32
NCG Pipeline Condensate Drains Emissions	0.00	0.00	0.00	0.00	0.09
North Cooling Tower Emissions	0.00	11.32	0.00	0.00	0.00
South Cooling Tower Emissions	0.00	11.32	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	24.82	0.00	0.00
Plant Source Total:	0.46	22.64	27.15	2.33	58.55

Injection Filter System

The Project would release up to 25 gallons of separated geothermal brine containing up to 1.1 ppm of hydrogen sulfide, 5.6 ppm benzene and 141.8 ppm ammonia gases from each of the approximately 64 geothermal injection filter system units up to four times per day. Conservatively assuming that half (32) of the 64 filter system units would discharge during the same hour, the hourly potential to emit for H₂S, benzene, ROCs and ammonia is as shown in Table 6. With four discharges per day, 365 days per year, the daily and annual potential to emit are as shown in Table 7 and Table 8, respectively (see also APPENDIX A).

Noncondensable Gas Condensate Drains

The Project would also release up to 18 gallons of condensate each hour from the noncondensable gas pipeline drains containing up to 1.1 ppm of hydrogen sulfide, 5.6 ppm benzene and 141.8 ppm ammonia gases. The hourly, daily and annual potential to emit from these noncondensable gas condensate drains are as shown in Table 6, Table 7 and Table 8, respectively (see also APPENDIX A).

Isopentane Sources

Each OEC Unit would have minor leaks of ROCs (isopentane) from the valves, connections, seals, and tubes which would be released either to the atmosphere or into the geothermal fluid or circulating cooling water lines. Isopentane would also be discharged to the atmosphere through the OEC VRUs, and during OEC Unit maintenance activities through the Maintenance VRU and opening sections of the OEC VRUs for maintenance. Experience with the most recent generation of OEC Units indicates that about one-third of the isopentane is discharged through fugitive emissions, and two-thirds from maintenance activities. Very little isopentane is discharged to the atmosphere through the OEC VRUs. Based on the results of quarterly inventories of isopentane in storage at other projects, Table 6, Table 7 and Table 8 provide the estimated hourly, daily and annual potential to emit isopentane, respectively (see also APPENDIX A).

Project operators would frequently inspect and monitor the OEC Units for isopentane leaks and visual signs of fugitive isopentane emissions. Ormat would also keep a record of valves, connections, seals, and tubes replaced to reduce pentane fugitive emissions.

Cooling Towers

The two Project cooling towers would each circulate up to 110,000 gallons of cooling water per minute containing up to 9,400 ppm by weight of total dissolved solids (TDS). High efficiency cooling tower drift eliminators would limit the drift rate to 0.0005 percent of the circulating cooling water rate. Conservatively assuming that all of the aerosols which form when the emitted cooling tower drift evaporated are PM10 or smaller, then the hourly PM10 potential to emit for each cooling tower is as shown in Table 6. With each cooling tower assumed to operate 24 hours per day, 365 days per year, the daily and hourly PM10 potential to emit are as listed in Table 7 and Table 8, respectively (see also APPENDIX A).

Emergency Standby Diesel Engine-Generator

The 535 kW emergency standby diesel engine-generator would meet the applicable California Air Resources Board (CARB) Tier 3 stationary compression ignition engine exhaust emission standards of NMHC+NO_x = 4.0, CO = 3.5 and PM = 0.20 grams per kilowatt-hour.

The engine would also comply with the CARB “Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines” for new stationary emergency standby diesel-fueled compression ignition engines >50 bhp (PM₁₀ ≤ 0.15 g/bhp-hr). As required by the ATCM, this diesel engine would also burn CARB diesel fuel (≤15 ppm sulfur). In compliance with the ATCM, this diesel engine would be tested for a total of less than 50 hours per year (for up to one hour per day). Other than for testing, this engine would operate only in emergencies.

Table 9, Table 10 and Table 11 provide the calculated hourly, daily and annual potential to emit, respectively, for this engine for the criteria air pollutants PM₁₀, NO_x, CO and SO₂, and for the criteria air pollutant precursor ROC, assuming that the engine is tested for no more than one hour per day. Table 12 provides the summary of the calculated annual HAP potential to emit, and Table 13 the summary of the calculated annual HAP abated emissions, for this engine.

Table 9: Emergency Diesel Engines Hourly Potential to Emit

Emission Source	Potential to Emit (lbs/hr)				
	PM10	ROC	CO	NOx	SO2
East Brawley Geothermal Development Project					
Emergency Standby Diesel Fire-Water Pump Engine	0.043	0.066	0.284	2.545	0.003
Emergency Standby Diesel Generator Engine	0.236	0.120	4.126	4.595	0.009
Emergency Engines Total:	0.278	0.186	4.410	7.140	0.012

Table 10: Emergency Diesel Engines Daily Potential to Emit

Emission Source	Potential to Emit (lbs/day)				
	PM10	ROC	CO	NOx	SO2
East Brawley Geothermal Development Project					
Emergency Standby Diesel Fire-Water Pump Engine	0.043	0.066	0.284	2.545	0.003
Emergency Standby Diesel Generator Engine	0.236	0.120	4.126	4.595	0.009
Emergency Engines Total:	0.278	0.186	4.410	7.140	0.012

Table 11: Emergency Diesel Engines Annual Potential to Emit

Emission Source	Potential to Emit (tons/yr)				
	PM10	ROC	CO	NOx	SO2
East Brawley Geothermal Development Project					
Emergency Standby Diesel Fire-Water Pump Engine	0.0011	0.0017	0.0071	0.0636	0.0001
Emergency Standby Diesel Generator Engine	0.0059	0.0030	0.1031	0.1149	0.0002
Emergency Engines Total:	0.0070	0.0047	0.1102	0.1785	0.0003

Table 12: Hazardous Air Pollutant Potential to Emit by Emission Unit

Emission Source	Hazardous Air Pollutant Potential to Emit (tons/yr)		
	Diesel HAPs	C6H6	Totals
High Pressure Separator PTE	0.00000	48.8754	48.8754
RTO Unit/Scrubber NCG Abatement System Emissions	0.00000	0.0000	0.0000
Sand Separators NCG Emissions	0.00000	2.2739	2.2739
Injection Filters NCG Emissions	0.00000	0.0527	0.0527
NCG Pipeline Condensate Drains Emissions	0.00000	0.0036	0.0036
North Cooling Tower Emissions	0.00000	0.0000	0.0000
South Cooling Tower Emissions	0.00000	0.0000	0.0000
OEC Isopentane Emissions	0.00000	0.0000	0.0000
Emergency Standby Diesel Fire-Water Pump Engine	0.00184	0.0000	0.0018
Emergency Standby Diesel Generator Engine	0.01015	0.0000	0.0102
Totals:	0.01199	51.2056	51.2176

Table 13: Hazardous Air Pollutant Abated Emissions by Emission Unit

Emission Source	Hazardous Air Pollutant Emissions (tons/yr)		
	Diesel HAPs	C6H6	Totals
High Pressure Separator PTE	0.00000	1.53991	1.53991
RTO Unit/Scrubber NCG Abatement System Emissions	0.00000	0.94671	0.94671
Sand Separators NCG Emissions	0.00000	2.27388	2.27388
Injection Filters NCG Emissions	0.00000	0.05273	0.05273
NCG Pipeline Condensate Drains Emissions	0.00000	0.00356	0.00356
North Cooling Tower Emissions	0.00000	0.00000	0.00000
South Cooling Tower Emissions	0.00000	0.00000	0.00000
OEC Isopentane Emissions	0.00000	0.00000	0.00000
Emergency Standby Diesel Fire-Water Pump Engine	0.00184	0.00000	0.00184
Emergency Standby Diesel Generator Engine	0.01015	0.00000	0.01015
Totals:	0.01199	4.81678	4.82877

Emergency Standby Diesel Fire Pump Engine

Based on manufacturer’s certifications, the 215 kW emergency standby diesel fire pump engine would emit less than the applicable CARB Tier 2 stationary compression ignition engine exhaust emission standards of NMHC+NO_x = 6.6, CO = 3.5 and PM = 0.20 grams per kilowatt-hour.

The engine would also comply with the CARB “Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines” for new stationary emergency standby diesel-fueled

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compression ignition engines >50 bhp ($PM_{\leq 0.15} \leq 0.15$ g/bhp-hr). As required by the ATCM, this diesel engine would also burn CARB diesel fuel (≤ 15 ppm sulfur). In compliance with the ATCM, this diesel engine would be tested for a total of less than 50 hours per year (for up to one hour per day). Other than for testing, this engine would operate only in emergencies.

Table 9, Table 10 and Table 11 provide the calculated hourly, daily and annual potential to emit, respectively, for this engine for the criteria air pollutants PM_{10} , NO_x , CO and SO_2 , and for the criteria air pollutant precursor ROC, assuming that the engine is tested for no more than one hour per day. Table 12 provides the summary of the calculated annual HAP potential to emit, and Table 13 the summary of the calculated annual HAP abated emissions, for this engine.

Summary of Facility Calculated Potential to Emit

Table 14 provides a summary of the Facility potential to emit air pollutants and air pollutant precursors from all emission units. Table 15 provides a summary of the Facility abated emissions of these air pollutants and air pollutant precursors from all emission units. Table 12 provides the summary of the calculated annual HAP potential to emit, and Table 13 the summary of the calculated annual HAP abated emissions, for each emission unit.

Table 14: Summary of Facility Potential to Emit

Description	Facility Potential to Emit							
	PM10	SO2	CO	NOx	ROC	H2S	NH3	C6H6
Hourly PTE (lbs):	5.45	0.0122	4.41	7.14	98.94	3.03	14.32	11.71
Daily PTE (lbs):	124.31	0.0122	4.41	7.14	416.76	72.62	329.25	280.58
Annual PTE (tons):	22.64	0.0003	0.11	0.18	76.03	13.25	60.09	51.21

Table 15: Summary of Facility Abated Emissions

Description	Facility Abated Emissions							
	PM10	SO2	CO	NOx	ROC	H2S	NH3	C6H6
Hourly PTE (lbs):	5.95	0.1467	4.41	8.09	88.01	0.17	13.97	0.78
Daily PTE (lbs):	136.31	3.2401	4.41	29.89	154.31	3.93	320.83	18.12
Annual PTE (tons):	24.79	0.5708	0.11	4.20	29.64	1.11	58.60	4.82

POTENTIAL EMISSIONS FROM CONSTRUCTION AND WELL FIELD START-UP ACTIVITIES

Grading and Site Construction

Construction of the power plant, new access roads and pipelines would produce fugitive dust from site grading and other construction-related surface disturbing activities. Construction of the power plant would directly disturb about 15 acres of land, and another 10 acres would be disturbed for the adjacent equipment laydown and fabrication yard (although the equipment laydown and fabrication yard would be reclaimed following the completion of construction). All surface-disturbing activities would implement appropriate techniques to comply with ICAPCD Regulation VIII to apply BACT to limit dust emissions. These would include watering the construction area at least twice a day; increasing watering frequency when winds exceed 15 mph; limiting vehicular speed to 15 mph on dirt roads and areas; and using gravel ramps at road entrances.

Existing access roads (paved, graveled or dirt) would be utilized to the extent practical. Any new access required for the Project would be constructed adjacent to the edges of the agricultural fields and parallel to irrigation canals and drains that traverse the Project area. Approximately 14 miles of pipeline would be built, but no new roads would be built for pipeline construction or maintenance and pipeline construction would not require grading of the pipeline routes.

Well Field Start-Up

Geothermal injection wells which are shut in for a period of time may develop a small cap of geothermal noncondensable gases in the well bore above the standing geothermal fluid as these gases are slowly released from the geothermal fluid. The relative proportions of these gases would generally resemble that in the produced geothermal noncondensable gas stream - approximately 99.97 percent carbon dioxide, methane, nitrogen, and argon, with the remainder consisting principally of C₆H₆, H₂S and ammonia.

Prior to placing any injection well into, or back into, service, these geothermal noncondensable gases capping the geothermal fluid would be discharged unabated to the atmosphere through a stack on the well site.

COMPLIANCE WITH APPLICABLE REGULATIONS

Rule 201 Permits Required

The Project is a new Facility that will emit air contaminants and thus requires an Authority to Construct from the ICAPCD.

Rule 206 Processing of Applications

Rule 206.A.4.c provides that the Air Pollution Control Officer shall take reasonable steps to insure that no Project will emit air contaminants that may endanger the short or long term health, safety or property of Persons. Attached as APPENDIX B is an assessment of the potential health risks of the benzene and hydrogen sulfide emissions from the geothermal noncondensable gas system. This assessment demonstrates that the Project would not emit benzene or hydrogen sulfide that would endanger the long-term health of nearby sensitive receptors.

Rule 207 New and Modified Stationary Source Review

Rule 207.C.1.a requires Best Available Control Technology (BACT) for equipment with the potential to emit 25 pounds per day or more of any nonattainment pollutant or its precursors.

The PM10 potential to emit from each cooling tower would exceed 25 lbs/day (see Table 7), and will require BACT, in the form of high efficiency drift eliminators capable of controlling cooling tower drift to 0.0005 percent or less of the circulating cooling water.

Each OEC Unit has the potential to emit more than 25 lbs/day of ROCs (isopentane) from major maintenance activities (see Table 7) and will require BACT. For each OEC Unit, BACT is use of the Maintenance VRU during OEC Unit maintenance activities. In addition, the use of OEC VRUs on each OEC Unit condenser and frequent inspection, monitoring and maintenance of each OEC Unit limits isopentane emissions.

The well pad high pressure separators have the potential to emit ROCs (benzene) in excess of 25 lbs/day (see Table 1) and will require BACT. Seventy-five percent (or more) of the noncondensable gases (including benzene) separated by the high pressure separators will be dissolved/entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. None of these gases will be emitted to the atmosphere. The other twenty-five percent (or less) of these separated geothermal noncondensable gases would flow through dedicated pipelines to the RTO unit/caustic scrubber system located at the power plant site. This system is considered BACT for the ROCs in this noncondensable gas stream as it will remove a minimum of 98 percent of the benzene in this gas stream.

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Rule 207.C.1.c requires Best Available Control Technology (BACT) for equipment with the potential to emit 55 pounds per day or more of hydrogen sulfide. None of the well pad high pressure separators will individually have the potential to emit more than 55 lbs/day of hydrogen sulfide, although together they will have the potential to emit more than 55 lbs/day of hydrogen sulfide during operations (see Table 1). These gases will be directed to the RTO unit/caustic scrubber system located at the power plant site, which will remove at least 98 percent of the hydrogen sulfide in this gas stream, which is considered to be BACT for the removal of hydrogen sulfide from these types of gasses.

Best Available Control Technology would not be required for any other emission unit.

Rule 207.C.2.a requires offsets for all emissions of ROCs, PM10 and other nonattainment pollutants from a source that exceed 137 pounds per day. The power plant would emit ROCs in excess of 137 pounds per day, so offsets will be required for the Facility. With ROCs emissions of 154.31 lbs/day (including the two emergency engines - see Table 15), the Facility would require offsets (at a ratio of 1.2 to 1) for 17.31 lbs/day, or 0.79 tons/quarter. However, Rule 207.C.f allows the Air Pollution Control Officer to exempt the two emergency engines from the offset requirements of Rule 207.C.2, which Ormat hereby requests. Without the ROC emissions from the two emergency engines, Facility ROC emissions would be 154.12 lbs/day, and the Facility would require offsets (at a ratio of 1.2 to 1) for 17.12 lbs/day, or 0.78 tons/quarter

Offsets would not be required for any other attainment or nonattainment air pollutant.

Rule 208 Permit to Operate

The ICAPCD may inspect and evaluate the new equipment prior to allowing the project to operate under its Permit to Operate. The Project would be available to the ICAPCD for inspection once it is constructed and commences operation.

Rule 216 Construction or Reconstruction of Major Stationary Sources that Emit Hazardous Air Pollutants

Rule 216 requires stationary sources of hazardous air pollutants to install best available control technology for toxics (T-BACT) on any constructed major source.

The well pad high pressure separators together have the potential to emit benzene in excess of 10 tons/yr and will require the implementation of T-BACT. Seventy-five percent or more of the benzene separated by the high pressure separators will be dissolved/entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. None of this benzene will be emitted to the atmosphere. The other twenty-five percent (or less) of the benzene in the

separated geothermal noncondensable gases would flow through dedicated pipelines to the RTO unit/caustic scrubber system located at the power plant site. This scrubbing system is considered T-BACT for the benzene in this noncondensable gas stream as it will remove a minimum of 98 percent of the benzene in this gas stream.

Rule 400 Fuel Burning Equipment – Oxides of Nitrogen

Each of the emergency standby diesel engines would emit less than 5 lb/hour of NO_x (see Table 9), far less than the standard of 140 lb/hour of NO_x. They would each also operate less than 50 hours per 12 month period and emit far less than the annual 5 tons of NO_x standard (see Table 11).

The definition of “fuel burning equipment” in Rule 101 excludes equipment that “serves primarily as air pollution control equipment by using a combustion process to destroy air contaminants.” Thus, the proposed RTO unit/caustic scrubber system is not considered “fuel burning equipment,” and Rule 400 is not applicable to the proposed RTO unit/caustic scrubber.

Rule 401 Opacity of Emissions

The cooling tower water vapor emissions are exempted from the requirements of Rule 401. The emissions of particulates from each of the emergency standby diesel engines would be in compliance with the California diesel particulate ATCM, and thus have an opacity substantially lighter than the No. 1 on the Ringlemann Chart (20% opacity) required by Rule 401.

Rule 403 General Limitations on the Discharge of Air Contaminants

Rule 403 prohibits emission of particulate matter in excess of the emission rates in Table 403-1. The weight of the cooling water circulating through each cooling tower is about 55,000,000 lbs/hr. In Table 403-1, the maximum discharge of particulate matter for any process that handles more than 1,000,000 lbs/hr is 30.0 lbs/hr. The particulate potential to emit from each cooling tower would be less than 3.0 lbs/hr (see Table 7).

Rule 403 also prohibits emission of air contaminants in excess of the rates in Table 403-2. The dry volume of gas (air) flowing through each cell of each cooling tower is estimated at 1,300,000 dry standard cubic feet per minute (dscfm), or about 13,000,000 dscfm for each 10-cell cooling tower. In Table 403-2, the maximum concentration of particulate matter in the discharge of any process that handles more than 2,472,000 dscfm is 0.0100 grains/dscf. The concentration of particulate matter in each cooling tower is calculated at less than 0.00003 gr/dscf (see Table 16).

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Table 16: Calculation of Maximum Concentrations of Air Contaminants

Description	Maximum Concentration of Air Contaminants				
	PM	PM10	H2S	H2S	H2S
Cooling Tower emissions [each tower] (lbs/hr):	2.584	2.584			
RTO Unit/Caustic Scrubber System emissions (lbs/hr):			0.058		
Sand separators emissions (lbs/hr):				0.103	
Injection filter emissions (lbs/hr):					0.007
Cooling Tower emissions (grains/min):	301.5	301.5			
Cooling Tower dscfm [each tower]:	13,000,000	13,000,000			
Cooling Tower Air Contaminant Concentrations (grains/dscf):	0.0000232	0.0000232			
Concentration Limitation - Rule 403.B.2:	0.0100	0.0100			
(Exceeded?):	NO	NO			
Noncondensable Gases in Geothermal Brine (%):				0.55%	0.55%
Mass of Noncondensable Gases Emitted (lbs/hr):			45,689.7	505.2	35.1
Molecular Weight of Air:			28.97	28.97	28.97
Molecular Weight of Carbon Dioxide:			44.01	44.01	44.01
CO2/air molecular mass ratio:			1.52	1.52	1.52
Density of Dry Air at STP (lbs/cu ft):			0.075	0.075	0.075
Density of Dry CO2 Gas at STP (lbs/cu ft):			0.114	0.114	0.114
Volume of Noncondensable Gases Emitted (cu ft/hr):			401,008.8	4,434.3	308.5
Molecular Weight of Hydrogen Sulfide:			34.08	34.08	34.08
Molecular Weight of Sulfur Dioxide:			64.06	64.06	64.06
SO2/H2S molecular mass ratio:			1.88	1.88	1.88
Sulfur Dioxide equivalent mass emission rate (lbs/hr):			0.110	0.193	0.013
Density of Dry SO2 Gas at STP (lbs/cu ft):			0.166	0.166	0.166
Volume of Sulfur Dioxide Equivalent Gases Emitted (cu ft/hr):			0.6620	1.1665	0.0811
Sulfur Dioxide Concentration (%):			0.00017%	0.02631%	0.02631%
Sulfur Dioxide Concentration Limit (%) (Rule 405B.1.a):			0.20000%	0.20000%	0.20000%
(Exceeded?):			NO	NO	NO

Rule 405 Sulfur Compounds Emission Standards, Limitations and Prohibitions

Rule 405B.1.a prohibits the discharge into the atmosphere of sulfur compounds, calculated as sulfur dioxide, in excess of 0.2 percent by volume, measured at the point of discharge. The maximum concentration of hydrogen sulfide, calculated as sulfur dioxide, in the geothermal noncondensable gases which would be discharged through the sand separators, injection filter system and condensate drains is 0.02631 percent by volume (see Table 16). The concentration of hydrogen sulfide, calculated as sulfur dioxide, in the RTO unit/caustic scrubber system which would be discharged through the scrubber system stack is 0.00025 percent by volume (see Table 16). Both are substantially below the limit of 0.2 percent by volume.

Rule 800-805 Fugitive Dust Requirements for Control of Fine Particulate Matter (PM10)

These rules control fugitive dust emissions from construction and earthmoving activities, from carry out and track out, from open areas, and paved and unpaved roads. If necessary, Ormat would revise its current dust control plan and provide 10-day advance notice to the ICAPCD. During construction Ormat would water disturbed lands to reduce dust emissions. After construction fugitive dust from open areas would be controlled through application and maintenance of water or dust suppressant(s) to all unvegetated areas, establishing vegetation on previously

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disturbed areas, or paving, applying and maintaining gravel, or applying and maintaining chemical stabilizers/suppressants.

Rule 900 Procedures for Issuing Permits to Operate for Sources Subject to Title V of the Federal Clean Air Act Amendments of 1990

The Facility does not have the potential to emit 100 tons per year (tpy) or more of any regulated air pollutant. The Facility would have the potential to emit 10 tpy or more of benzene, a hazardous air pollutant (HAP), except for the implementation of the RTO unit/caustic scrubber system. If the Facility's request for synthetic minor source status is accepted by the District, the Facility would not be a major source subject to Rule 900.

Rule 902 - Request for Synthetic Minor Source Status

This rule authorizes the owners or operators of specified stationary sources that would otherwise be major sources (pursuant to Rule 900) to request and accept federally-enforceable emissions limits sufficient to allow the sources to be considered "synthetic minor sources." The Facility is submitting as part of this application a request for synthetic minor source status as the proposed implementation of the RTO unit/caustic scrubber system would reduce the Facility's potential to emit benzene, a hazardous air pollutant (HAP), from in excess of 10 tpy to well under 10 tpy. These emission limitations would be set forth in permit conditions practicably enforceable by U.S. EPA and citizens or by the District.

Rule 1101 New Source Performance Standards (NSPS)

All of the stationary emergency engines proposed for the Facility would be new diesel engines, and therefore would be subject to the requirements of 40 CFR Part 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines). Ormat Nevada, Inc. will comply with the requirements of this NSPS by:

- Operating and maintaining the diesel engines according to the manufacturer's written instructions over the entire life of each engine;
- Using fuel which meets the minimum standards set forth in the regulations;
- Installing a non-resettable hour meter prior to startup of the engine;
- Limiting maintenance checks and readiness testing of each engine to less than 50 hours per year; and
- Keeping records of the operation of each engine in emergency and non-emergency service that are recorded through the non-resettable hour meter, including recording the time of operation of each engine and the reason each engine was in operation during that time.

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Rule 1002 California Airborne Toxic Control Measures (ATCMs)

Each of the two emergency standby diesel engines would meet the applicable CARB Tier stationary compression ignition engine exhaust emission standards and comply with the CARB “Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines” for new stationary emergency standby diesel-fueled compression ignition engines >50 bhp. In compliance with the ATCM, each of these diesel engines would be tested for a total of less than 50 hours per year (for up to one hour per day). Other than for testing, each emergency standby engine would operate only in emergencies. Each engine would also burn CARB diesel fuel (≤ 15 ppm sulfur).

Rule 1003 Hexavalent Chromium Emissions from Cooling Towers

The cooling towers would not use additives containing hexavalent chromium, and would thus be eligible for exemption from testing requirements.

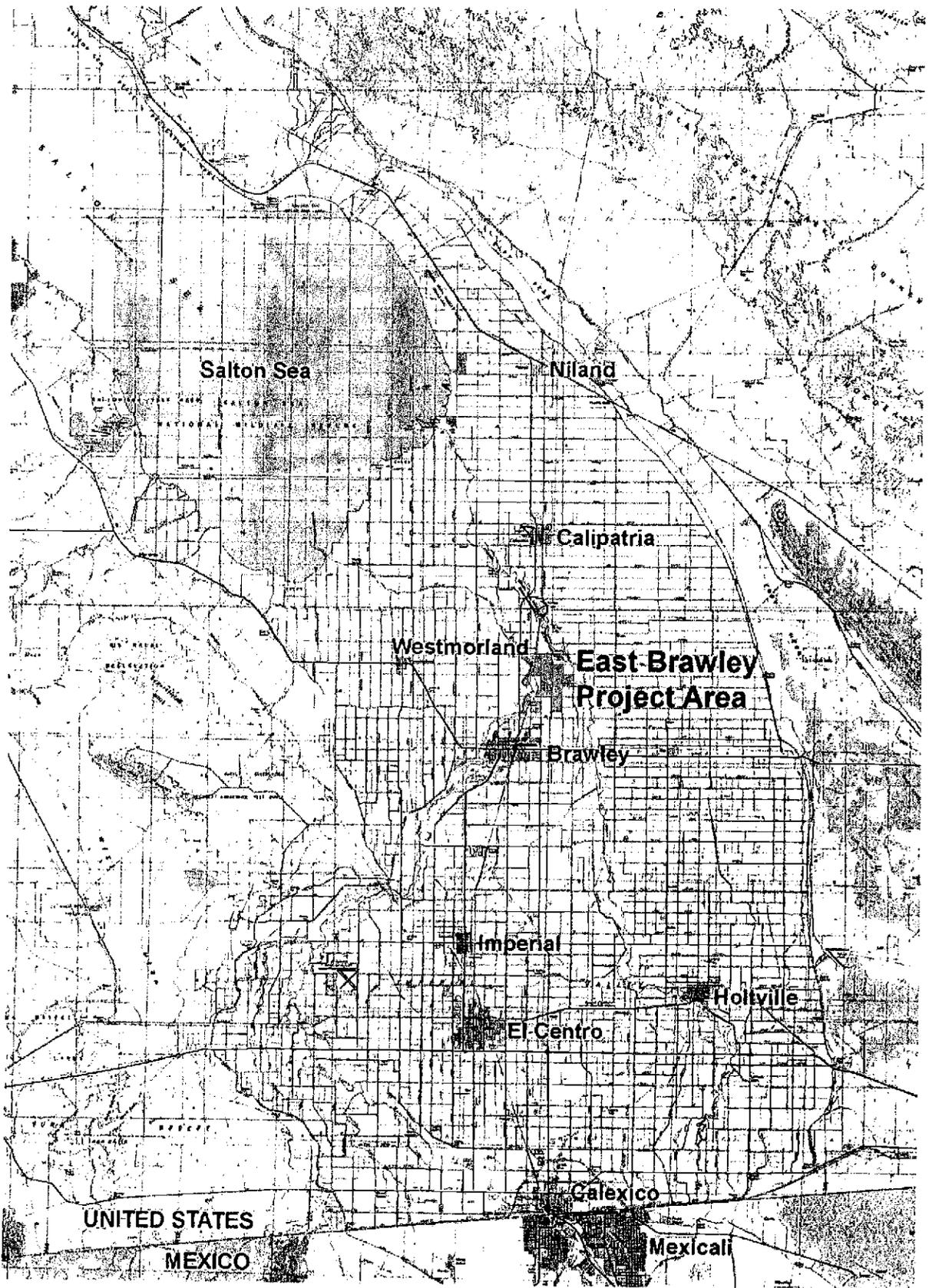


Figure 1: East Brawley Geothermal Development Project Location Map



- Proposed Geothermal Development Well Site: ●
- Approved Geothermal Exploration Well Site: ●
- Proposed Geothermal Pipeline Route: —
- Proposed Freshwater Pipeline Route: —
- Proposed New River Crossing: |

Project Area Extents
Shown on the Figure:



TN*, MN
12°

0 0.5 1.0
Miles

Figure 2: East Brawley Project Power Plant and Wellfield Map

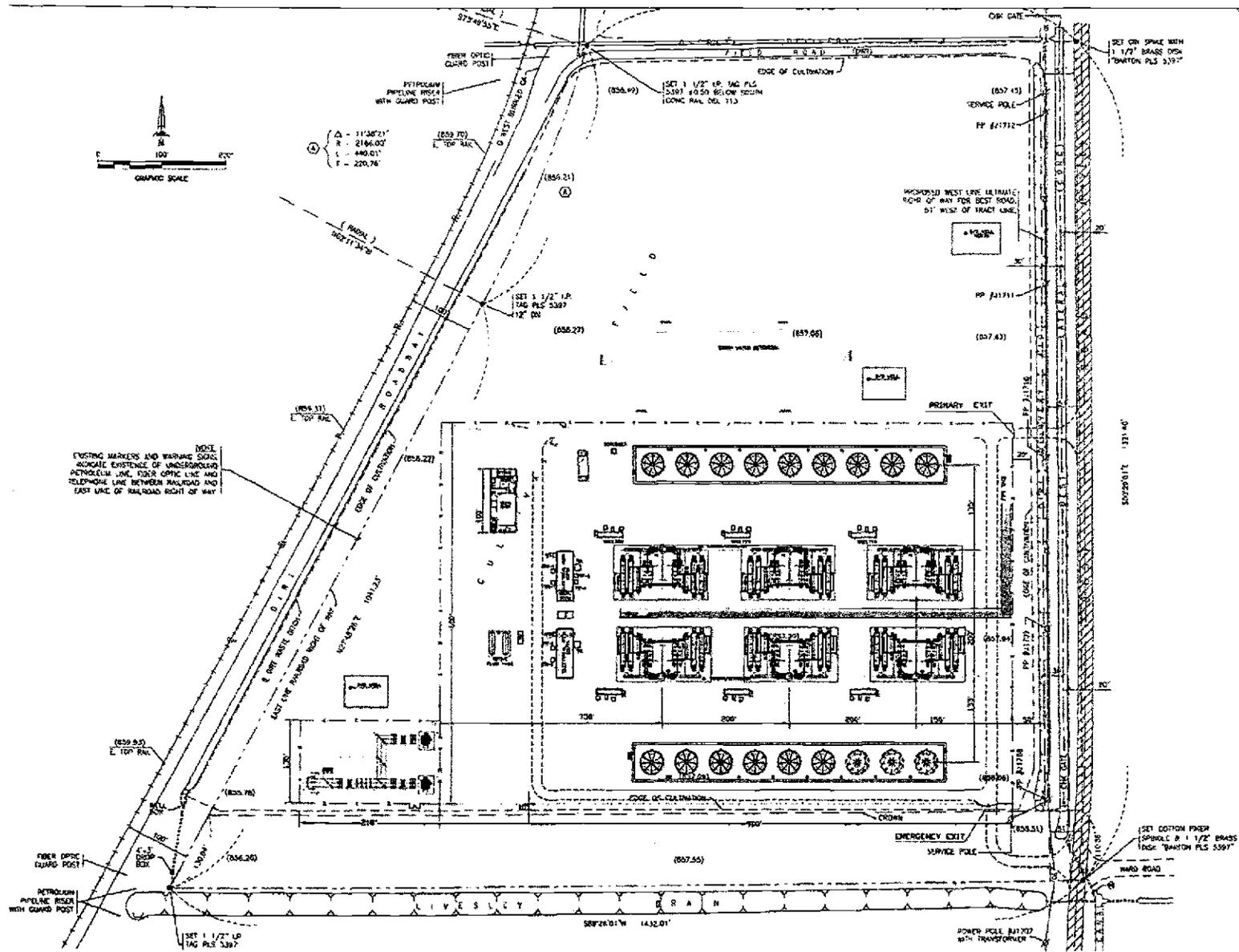


Figure 3: East Brawley Project Power Plant General Arrangement – Map View

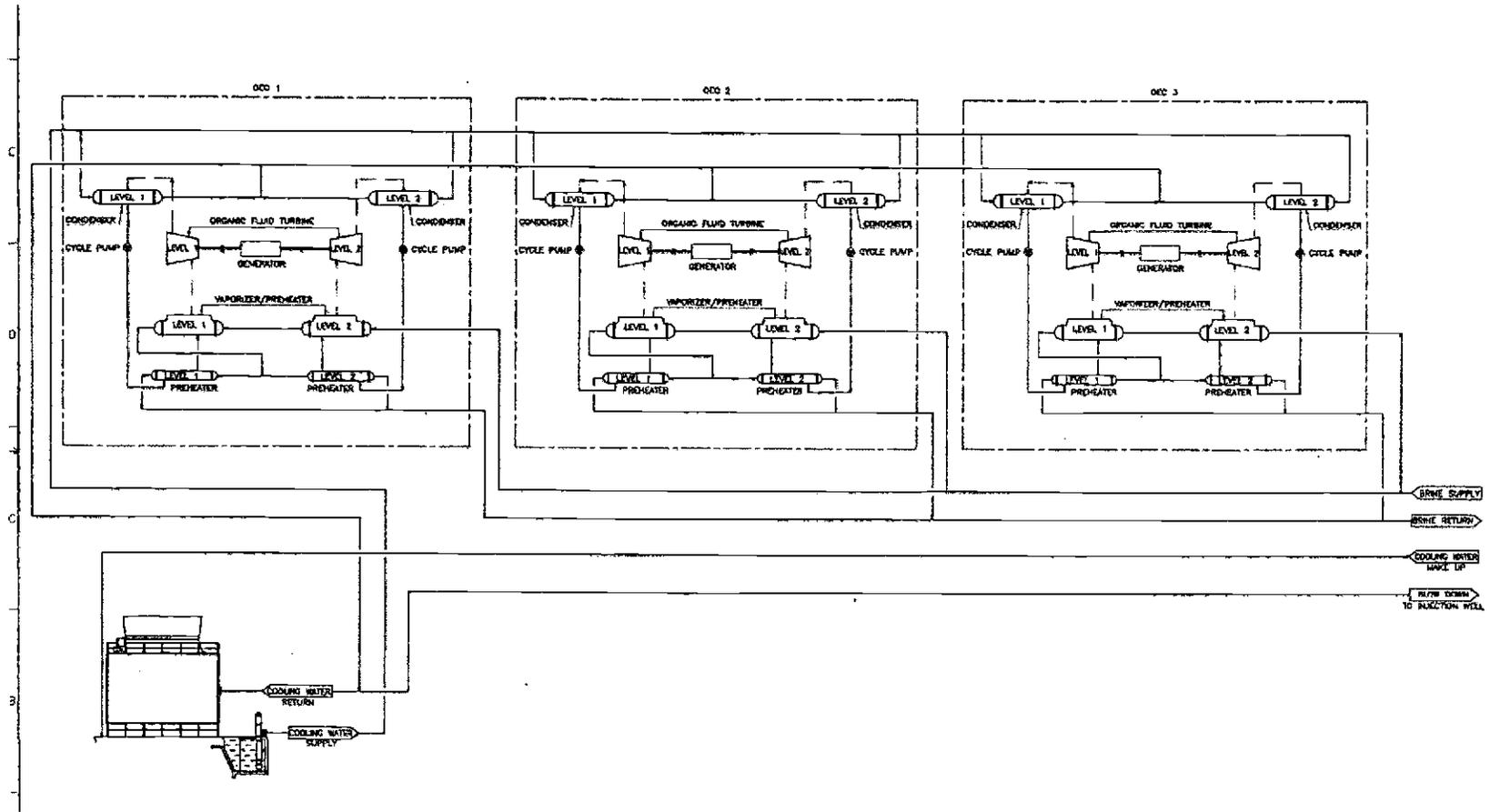


Figure 4: East Brawley Project Power Plant Basic Block Diagram (Sheet 1)

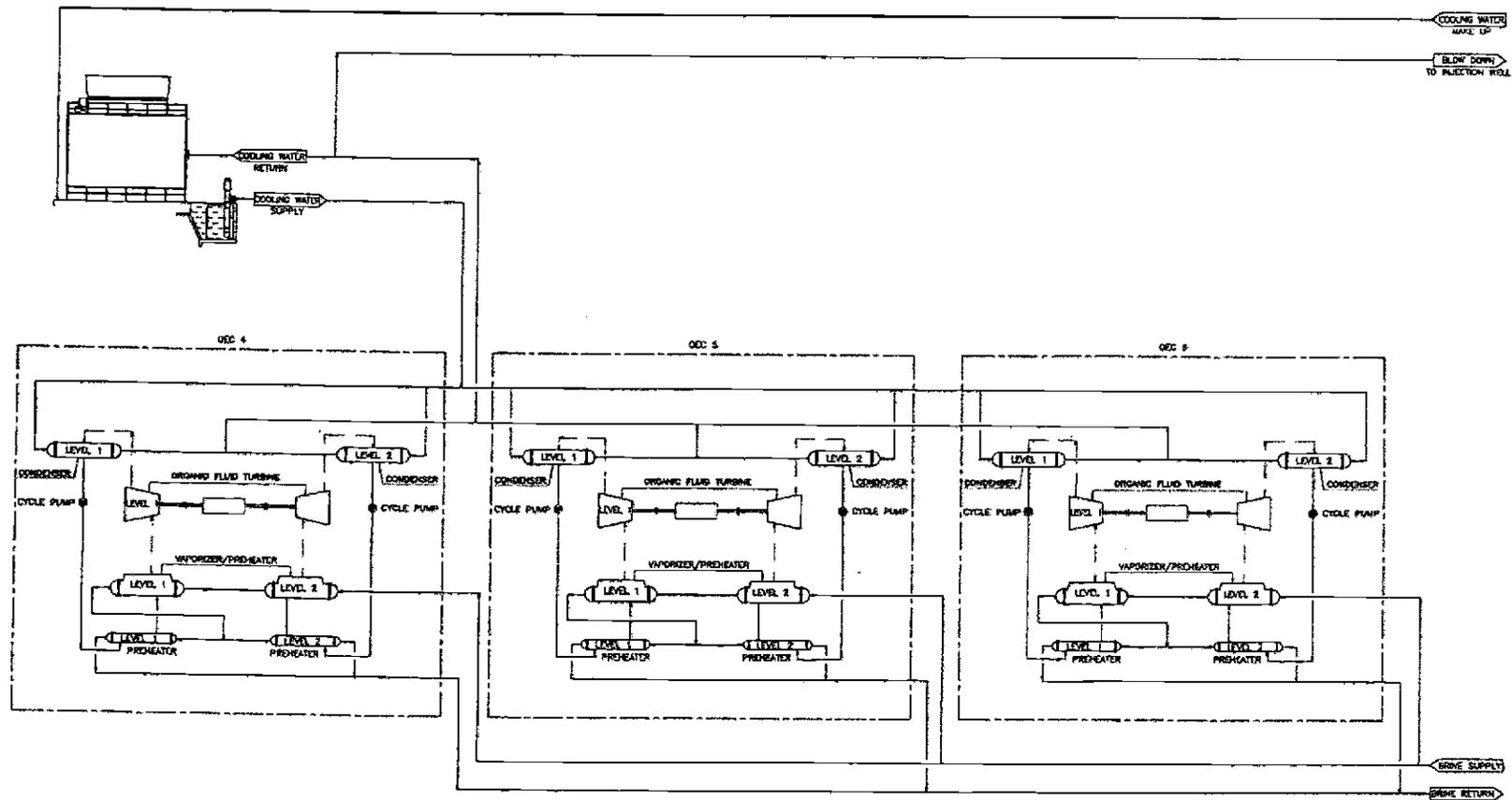


Figure 5: East Brawley Project Power Plant Basic Block Diagram (Sheet 2)

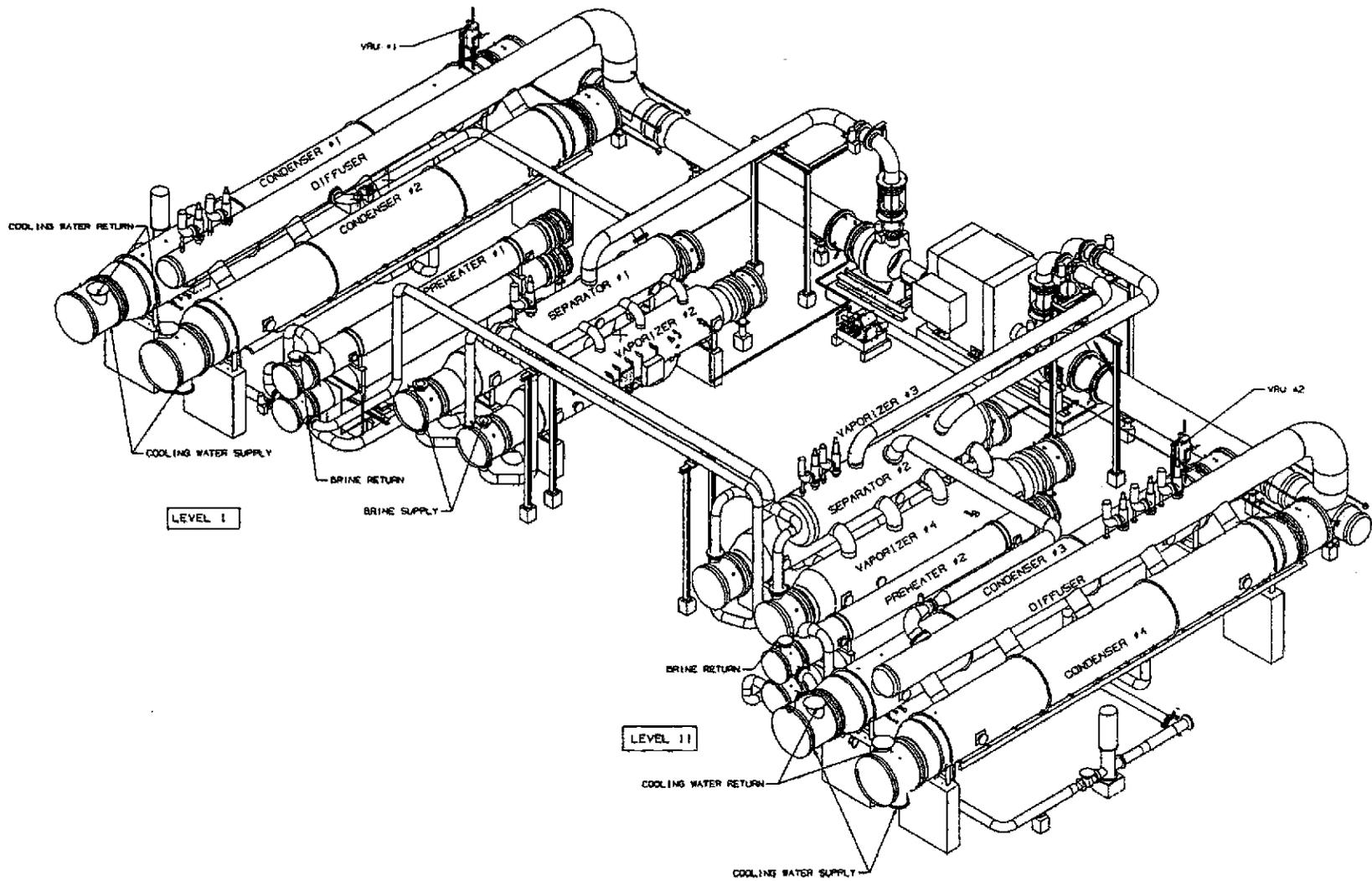


Figure 6: General Arrangement (Perspective View) of Single OEC Unit (One of Six)

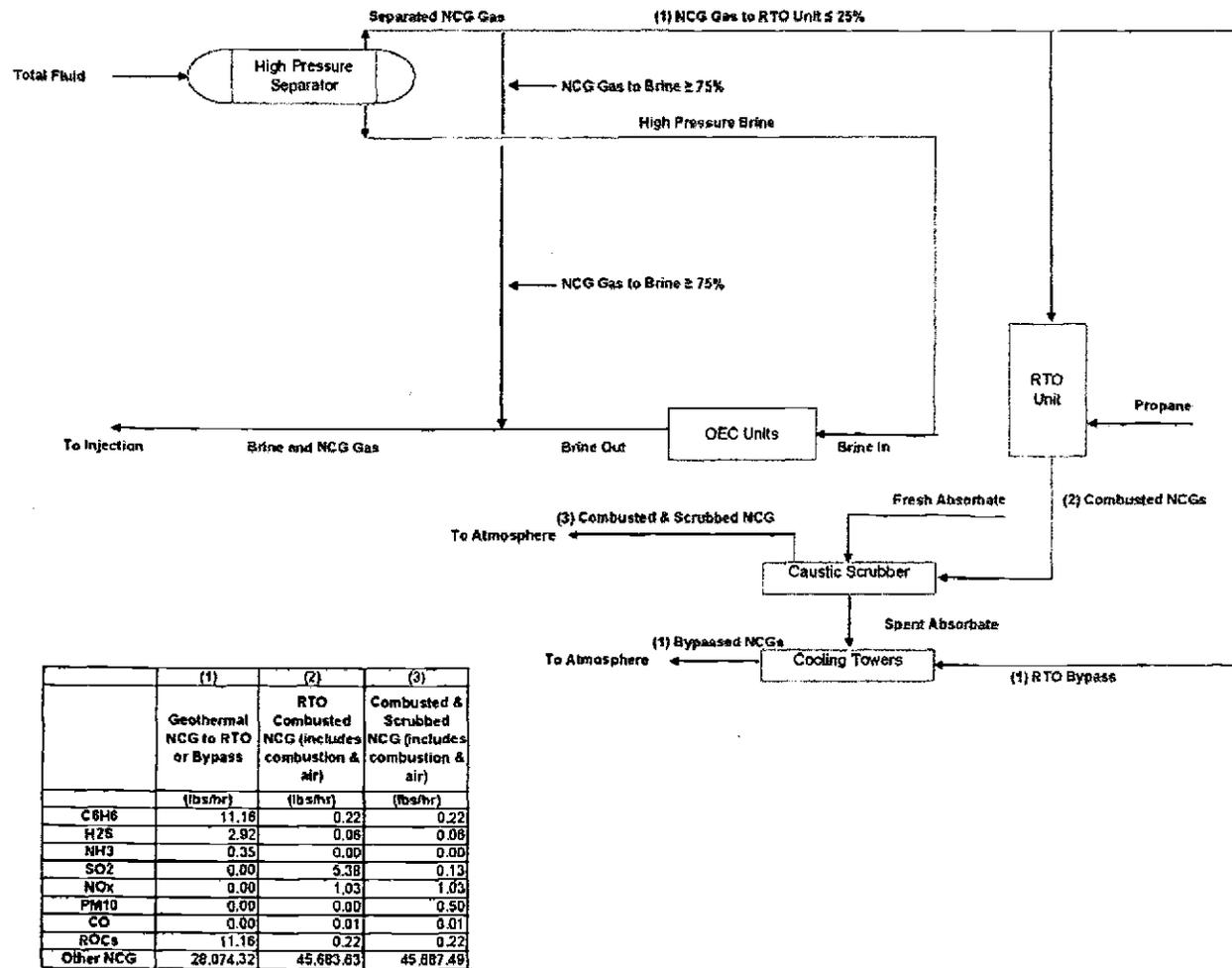


Figure 7: East Brawley Noncondensable Gas Separation and RTO Unit/Caustic Scrubber System Process Flow Diagram

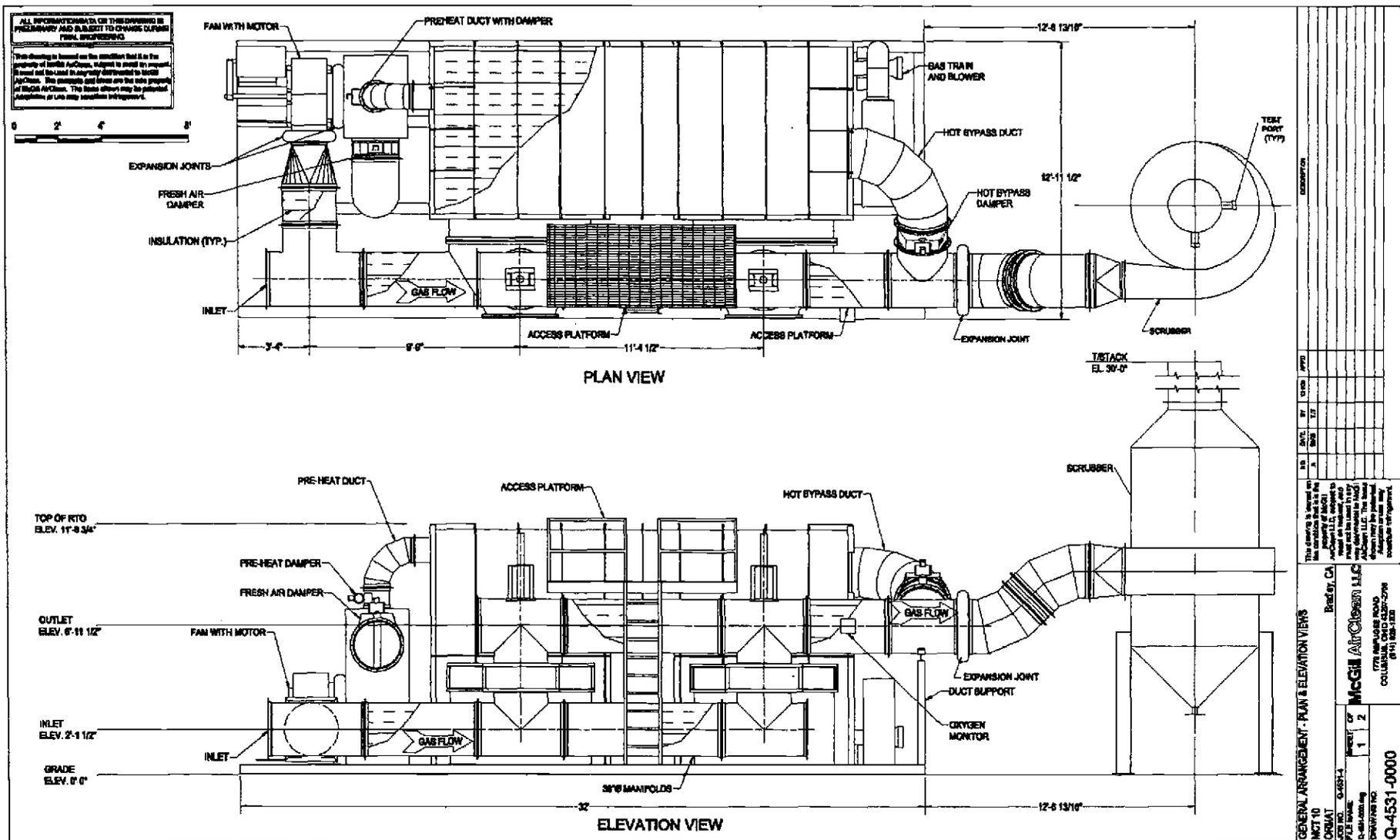


Figure 8: East Brawley RTO Unit/Caustic Scrubber System General Arrangement – Plan and Elevation Views

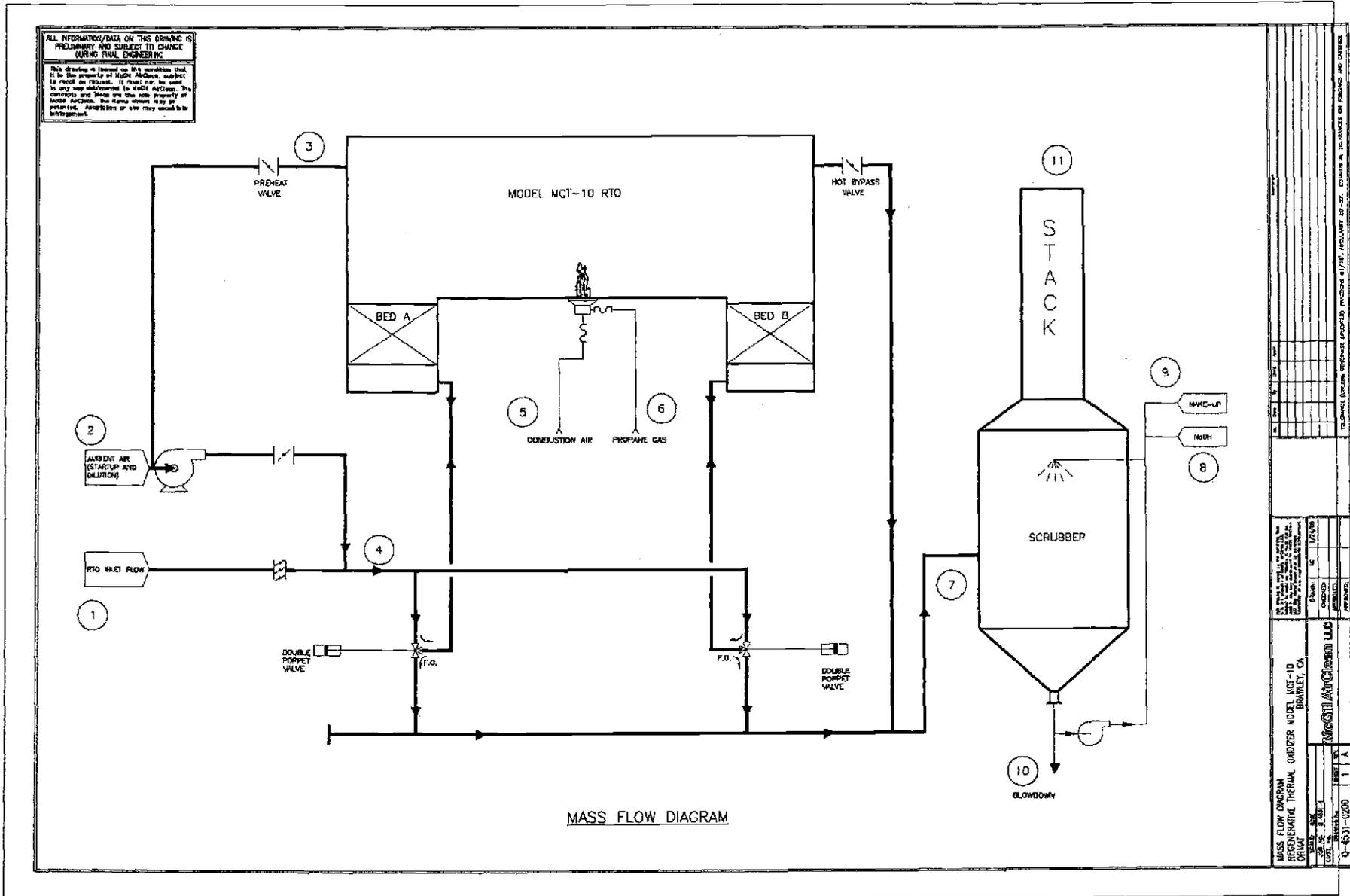


Figure 9: East Brawley RTO Unit/Caustic Scrubber System Process Flow Diagram

EXHIBIT 35



150 megawatt facility.¹ Staff therefore will recommend that the Commission assert its jurisdiction to license these facilities. The common project proponent, Luz Engineering Corporation (LUZ) questions the jurisdiction of the Commission, pointing out (1) that each of the five projects has been recognized as an individual 30 megawatt unit for purposes of qualifying under the Public Utility Regulatory Policy Act of 1978 (PURPA) as a small power producer, (2) that each unit will be separately owned by a limited partnership (with LUZ as the general partner), (3) that each unit has its own SO 4 contract with Southern California Edison Company, and (4) that substantial amounts of equipment (e.g. generators, supplementary boilers, solar collector fields, cooling towers, etc.) are not commonly shared among units because of the need to qualify as separate projects for purposes of PURPA. LUZ also argues that the nominal accumulated 150 MW of capacity of the facilities must be derated by at least 33 1/3 percent because of the nature of the solar technology, and further, that LUZ's actions are justified because LUZ has not had the benefit of any regulations by the CEC specifically indicating that it has jurisdiction over groups of facilities that separately are all below 50 MW but taken together are 50 MW or more.

While it appears, without full factual inquiry into the matter, that staff may be correct in its conclusions regarding the applicability of the Commission's jurisdiction over these facilities, there are other complicating factors that require careful consideration and potential exercise of prosecutorial discretion by the Commission. First, this Commission has, since its inception in 1975, encouraged the development of increased generation capacity using renewable (non-depleting) fuels. For many years, the Commission has also recognized and emphasized the value in diversifying the state's portfolio of generation sources in order to decrease the state's current over-reliance on oil- and natural gas-fired generation technologies so that the state would be less dependent upon fuels that may become scarce or very expensive in the long term. Additionally, in its most recent Electricity Report, the Commission emphasized the need for generation technologies that could or would follow or match the generation system's loads, being more available during system peaks and less available at other times when the needs are lower. Based on representations of LUZ, the LuzSegs project appears to be strong in each of these areas. If these representations are true, then it would be inconsistent with long-standing Commission policy for the Commission to take action that prevents these projects from coming to fruition.

LUZ also represents to the Commission, however, that the financing for its unique project is in jeopardy if the Commission questions the continuing viability of the project by commencing

¹ A more detailed description of the project and its common proponents is provided in the attached Appendix I.

formal complaint and investigatory procedures to require licensing of the project under the Warren-Alquist Act. Based on the investigation by staff, it appears that construction of the first two of the five units is, at this time, substantially complete, and that substantial construction on the third unit has also occurred. In addition, LUZ has recently commenced on-site construction of the fourth unit in order to meet an October 31, 1986 deadline for commencement of construction in order to qualify the project for solar tax credit treatment in the 1987 tax year. LUZ has represented that it will not commence construction on any other units, including Unit VII, without having obtained either a determination that the Commission has no jurisdiction or an appropriate certification to proceed from the Energy Commission.

The Commission regrets that the project proponent commenced construction without seeking a determination whether a Commission license would be required since it is this unfortunate action that now leaves so little time for the Commission to work on potential solutions to the dilemma faced by LUZ. Nonetheless, while it would have been a more prudent course to inquire in advance of commencing construction as to the Commission's view of its jurisdiction over the project, the Commission has no evidence suggesting that LUZ has intentionally sought to circumvent the statutory requirements of the Warren-Alquist Act. The Commission does not find the arguments made by LUZ as to the Commission's jurisdiction over the project to be compelling. Nonetheless, the Commission believes that LUZ makes these arguments in good faith and that when LUZ commenced construction, it believed, based upon the advice of counsel, that it could legally proceed without obtaining certification under the Warren-Alquist Act.²

Given both the apparent lack of intent to violate any

² This conclusion might be most strongly questioned with respect to the relatively recent commencement of construction of Unit VI while the applicant had clear notice that the staff's investigation was in progress. Nevertheless, it appears from the unusual facts in this case that avoidance of CEC jurisdiction was not the motivating factor behind this action. Instead, from LUZ's perspective, the October 31, 1986 deadline for commencement of construction in the income tax laws virtually compelled LUZ to proceed with construction and then assert its defenses if necessary to the question of our jurisdiction since eligibility for the solar tax credit is apparently a major factor in the economic feasibility of developing this new technology. The CEC has long supported the solar tax credit at both the state and federal levels in order to create just this type of incentive so that this kind of project would be able to proceed. Thus in this unique case, it appears to be more important to focus on what environmental damage may have been done and what mitigation is appropriate than to focus on the past actions of the developer.

provision of law and the potentially substantial benefits the project may provide the state, the Commission is inclined to try to find a way to resolve the problems that could result from our jurisdiction over these facilities. Nevertheless, we must find such solutions within the framework of the statutes that we administer. As a matter of law, subject matter jurisdiction either exists or it does not exist. We can neither waive it if it does exist, nor create it by stipulation if it does not. Marin Municipal Water District v. North Coast Water Co. (1918) 178 Cal. 324, 173 P. 473, 474. On the other hand, the Warren-Alquist Act does not require us to bring suit to enjoin a potential or alleged violation where the party in question appears before the Commission in good faith and seeks licensing in accordance with the Act. Staff has indicated that with a cooperative applicant, an AFC for a project of this type could probably be processed in 7 to 8 months. The principal issues we would anticipate in the proceeding relate to the environmental impacts of construction in this area which appears to support protected and endangered species.³ Work needs to be done to determine from data available on site or from surrounding areas what species may have existed on the site before construction began, what environmental mitigation measures would have been recommended based on a projection of the likely species involved, and what appropriate mitigation measures can now be devised to compensate for the damage that has already occurred as a result of construction of the facilities.

The most difficult question for the Commission is what action, if any, to take with respect to the construction which we understand is continuing on the site. From an enforcement perspective, the appropriate action is to order construction to halt until the Commission has completed its licensing proceeding. Unfortunately, this action does nothing to undo the potential environmental harm that is likely to have occurred up to this point, and it may jeopardize the success of a unique project that the Commission, from the perspective of its long-standing energy policy, would like to see succeed. Thus while ordering a halt to construction at this point would send an appropriate message to similarly situated developers that the Commission will not tolerate avoidance of its jurisdiction, this benefit must be weighed against the high probability, based on representations by LUZ, that ordering a halt to construction would irrevocably

³ One issue that apparently troubles staff is the indication, from documents it has examined, that LUZ has been less than fully co-operative with San Bernardino County and Department of Fish and Game in following through on mitigation measures that were discussed when the facilities were originally licensed at the local level. Staff and LUZ need to develop further information on this subject, but statements by LUZ under oath at the hearing on October 29, 1986 on this resolution suggest that one of the main problems, payment for land to be set aside as part of a desert tortoise reserve, has now been resolved.

destroy this unique and potentially desirable project's financial integrity. If the project fails as a result of inability to obtain financing or tax credits, the environmental values that might be served through a mitigation plan to be developed in the AFC process would not be furthered. On the other hand, if the Commission exercises its prosecutorial discretion, taking no action to prevent the project from proceeding forward, it may be possible to allow the project to proceed successfully while at the same time obtaining appropriate compensating mitigation for the damage done as a result of premature construction. Without in any way suggesting that this resolution of the issue would be appropriate in a case involving a project with less significance in terms of California energy policy,⁴ the Commission is inclined to exercise its prosecutorial discretion as described above if

- ① LUZ begins immediately to work with staff to develop and process the necessary AFC for its project, and
- ② LUZ satisfies staff within 30 days of this resolution that it has undertaken every action required of it in its previous dealings with the San Bernardino County and the Department of Fish and Game relating to mitigation of biological impacts on the site.

The Commission cannot and does not prejudge any of the issues that may arise during the licensing proceedings contemplated above. Nevertheless, we do note that our judgment not to pursue the full range of potential remedies that might be available if it were determined that LUZ had willfully violated our power facility siting jurisdiction is based in part on several factors that suggest that the LUZ facilities will likely be able to be licensed under the Warren-Alquist Act given

⁴ Indeed, this resolution should not be read to create a broad new remedy for parties who have commenced construction prior to seeking licensing from the Commission. The Commission's decision to exercise prosecutorial discretion in this case is based on all of the unique facts of this particular case including, but not limited to, ① the fact that this is the first major solar thermal installation in California, ② that it appears to match SCE's load almost perfectly, that LUZ has testified that it will save the energy equivalent of approximately 750,000 barrels of oil per year, and that based on testimony received, it appears that there is no known opposition to the project even among the environmental organizations who might be most likely to raise concerns about its impacts and who were consulted when the LUZ project was being reviewed at the county level. While the Commission does not totally foreclose the possibility that it might find grounds to exercise prosecutorial discretion in another case as well, it does firmly indicate that the process of continuing construction during the course of licensing is strongly disfavored as a general principle and should be tolerated only in the most unusual and compelling circumstances.

adequate cooperation by LUZ.⁵ First, in most power facility siting cases today, the most difficult issue is need for the power to be generated by the facility. We note that in the fifth Electricity Report (ER V), the Commission set aside 300 megawatts of reserved need for solar powered generation in order to encourage the development of this technology and the diversification of the state's generation system by offering solar projects the easiest of four need tests developed in ER V. The LUZ project is the first to bid for permission to fill that reserved need. Moreover, it appears from testimony by LUZ, that this project is designed to follow or "match" the Southern California Edison Co. peak loads very well, thus suggesting that it would be a logical addition to the Edison system even if the ER V methodology for need determinations is changed in the upcoming adoption of ER VI. Additionally, we note that environmental documentation has already been prepared for San Bernardino county's review and that the county permitted the projects to proceed based on a negative declaration--a finding that the projects would have no significant adverse environmental effects. This Commission is not legally bound to concur with the county's finding, and based upon staff preliminary review, probably would not concur, but the existence of this previous review suggests that the possible environmental concerns can be overcome through appropriate mitigation.

Based on all of the foregoing, the Commission therefore directs its staff as follows:

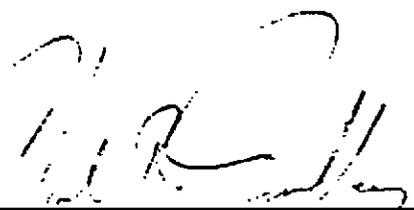
(1) If an application for certification of LuzSegs Units III, IV, V, VI and VII is filed and deemed adequate on or before January 7, 1987, staff shall endeavor to bring the matter to the full Commission for decision no later than September 9, 1987.

(2) So long as LUZ proceeds to remedy the jurisdictional problems identified by staff in accordance with the procedure set forth herein, the Commission resolves that it will not seek any injunctive relief or in any way attempt to interfere with the construction or operation of LuzSegs Units III, IV, V, and VI. Pursuant to agreements made on the record of the Commission's hearing on this matter, LUZ shall halt construction on Unit VI for a period of 7 days in order to permit the staff to visit the site and observe it prior to any further construction. Ground-breaking for Unit VII shall not commence until the Commission has licensed those facilities since such construction activity could disrupt environmental evaluation and mitigation work necessary to license the facilities.

⁵ Any substantial doubts about the likelihood of success in obtaining certification would obviously militate against the exercise of prosecutorial discretion.

(3) Staff shall report back to the Commission periodically on the progress of work with LUZ to resolve these jurisdictional problems and any problems that develop during the course of licensing work.

DATED: October 29, 1986



Charles R. Imbrecht
Chairman

APPENDIX I

The project proponent, Luz Engineering Corporation (LUZ), utilizes parabolic trough reflectors that focus the sun's rays on evacuated tubes carrying heat transfer fluid. The heat exchange unit is used to generate steam. The steam is then superheated in a supplementary gas-fired boiler. The superheated steam produces electric energy in a steam turbine-generator. The design is represented as unique, even among solar projects, for its ability to generate steam in the supplemental boiler, which allows production of electric energy at any time. Within the 25% fossil fuel limitation imposed on PURPA Small Power Producers, the equipment can generate electricity using natural gas during all winter evening peak hours.

LUZ is a California corporation which designs, finances, and constructs solar electric generating systems (SEGS). In addition to the units (III-VII) under review, LUZ plans six more 30 MW facilities (at unspecified locations). LUZ maintains that it organizes these projects solely for the purpose of selling its solar hardware equipment to the individual partnerships. LUZ is the managing general partner in each limited partnership.

On April 17, 1985, LUZ executed individual power sales agreements (SO4) with SCE on behalf of five limited partnerships.

The land is owned by or under option to LUZ, who will lease to each unit. In September 1985, the existing limited partnerships contracted with Blount Constructors (a division of Blount International Limited) for turn-key work including engineering, procurement, and construction. In October 1985, Blount International Ltd. contracted with Westinghouse for the design and supply of each unit's power block. Luz Industries Israel (a Luz International Limited subsidiary) was individually contracted to

provide solar field design and hardware. Cogeneration National Corporation Southern Division was selected as the engineer for plant integration. Each unit separately appointed Cogeneration National Corporation Northern Division as "owner representative" and overseer of Blount's contract.

On October 15, 1985, LUZ submitted applications for individual site certifications by the County of San Bernardino. On December 3, 1985, the County issued mitigated negative declarations of environmental significance, and approved all applications on December 20, 1985. Individual applications for Authorities to Construct are being currently processed for each unit. However, the developer is participating in a San Bernardino County Air Pollution Control District (SBAPCD) evaluation of the cumulative NOx emissions standard. SBAPCD consultation with the ARB to confirm satisfaction of state modeling and monitoring requirements is planned. The developer will also be meeting with the EPA to confirm compliance with PSD requirements (although cumulative emissions analysis indicates that annual emissions will not exceed EPA threshold values).

Units III-VII are proposed at land owned or under option to LUZ (to be leased for the term of the project to each limited partnership) at Kramer Junction, San Bernardino County:

Unit	Construction Start Date	Owner*	Net Generating Capacity
III	12/85	LuzSegs Partners III	30 MW
IV	12/85	LuzSegs Partners IV	"
V	7/86	LuzSegs Partners V	"
VI	12/86	LuzSegs Partners VI	"
VII	7/87	LuzSegs Partners VII	"

*LUZ is the general partner in each partnership, and will exercise general management and control of all units. The only executed partnership agreement provided for review indicates that for Unit IV, LUZ is entitled to 100% of profits and losses.

All units were conceived and developed simultaneously by LUZ. Because of the ownership arrangements, LUZ will continue participating in each unit as land owner, general partner, and potential central operations manager.

On July 10, 1986, LUZ described these units as follows:

"Luz Engineering Corporation was the solar system supplier for two previous solar electric generating systems known as SEGS I and SEGS II. Both of these projects were constructed on land leased from Southern California Edison Company at Daggett, California. Due to the successful startup of SEGS I in December, 1984 and the commencement of construction of SEGS II in early 1985, Luz proceeded to conceive a plan for five

additional projects in the Mojave Desert Region. Consequently, land at Kramer Junction was purchased (or optioned) and five separate Standard Offer No. 4 contracts were executed with Southern California Edison Company on April 17, 1985. Subsequent Interconnect Facility Agreements were approved and executed between each of Luz Solar Partners Limited, III, IV, V, VI and VII and SCE on February 19, 1986." [Emphasis added.]

According to LUZ, each unit was FERC-certified as a separate project because the 30 MW generating capacity is the maximum size allowed by FERC.

Staff has disregarded the FERC designation of separate QFs as a basis for treating the LUZ units as single projects and maintains that for environmental and energy supply purposes, evaluation of the LUZ projects as a single powerplant is not precluded by federal designations. In the Unit I FERC decision, the Secretary specifically noted:

"Certification as a qualifying facility serves only to establish eligibility for benefits provided by the Public Utility Regulatory Policies Act of 1978, as implemented by the Commission's regulations, 18 CFR Part 292. It does not relieve a facility of any other requirements of local, state or federal law, including those regarding siting, construction, operation, licensing and pollution abatement. Certification does not establish any property rights, resolve competing claims for a site, or authorize construction." (Docket No. QF84-434-000, 2/6/85)

Units III and IV were simultaneously constructed. Units V-VII are planned for sequential construction to be completed within approximately 16 months of Unit III and IV. According to LUZ, the staggered schedule is required to effect a pre-construction financing strategy.

As general partner, LUZ will exercise complete management control over all units. Moreover, Luz and Cogeneration National (as a joint venture) will offer each partnership (of which LUZ is the controlling manager-general partner) an "operations contract" (7/10/86 submittal, p. 8).

All units are identically designed and proposed at a common location which is property owned or controlled by LUZ. Each 160 acre fenced parcel contains a solar field and power block and is physically separated from the other parcels by 125 feet buffer areas (on which utility and access roads are placed).

According to LUZ, the following equipment is not shared:

Turbine/Generator Unit. Condenser and feedwater Heaters.
Solar Heat Transfer System/Power Cycle Preheaters, Steam Generators and Steam Superheaters. Supplementary Natural Gas Boiler and all support equipment thereto. Power Cycle Condensate

and Feedwater Pumps. Turbine Lube Oil System. Heat Transfer Fluid system including all pumps, instrumentation, controls and expansion tank. Solar Collector Field of approximately 200,000 square meters. Cooling Tower. Demineralizer Treatment Water System. Instrument Air System. Plant Air System. Control Building and all Plant Control Systems. Plant Lighting System. Plant Electrical System with Motor Control Centers. Plant Transformers. Plant Circuit Breakers. Switchyard. Solar Field Header Piping. Solar Field Roads. Water Storage Tank. Water Transfer Pumps. Fire Protection Pumps. Fire Protection System. Evaporation Pond. Waste Water Neutralization System. Feedwater Chemical Treatment System. Plant Parking Area. Natural Gas Reducing and Metering Station. Electrical Metering Station. Water Metering Station. Emergency Oil Heater System. Emergency Power Diesel Generator. Spare Parts Inventory. Sewage System. Condensate Storage Tanks. Electrical Grounding System. Wastewater Blowdown System and Piping.

Basically, the developer contends that the separate equipment is required to maintain the maximum legal design permissible to retain QF eligibility.

All units share utility services for water (pursuant to a "Cotenancy Agreement" for the construction, maintenance and operation of a water supply pipeline required by the local water district); electrical interconnection (owned, maintained, and operated by SCE); natural gas (installed, owned, maintained and operated by PGandE Company); and road access.

Each unit individually executed (or will execute) contracts for equipment purchases and procurement, engineering, and construction.

As designed, the units are physically separate, but with common operational management and common ownership interests.



EXHIBIT 36

RECEIVED

'SEP 1 C 1987

MONO COUNTY
OFFICE OF ENERGY MANAGEMENT

September 3, 1987

Mr. Daniel Lyster
Mono County Energy Management
P.O. Box 8060
Mammoth Lakes, CA 93546

Dear Mr. Lyster:

Re: Comments on the Draft Environmental Impact Report/Environmental Assessment for the Mammoth Pacific Geothermal Development Project: Units II and III (SCH# 86112408)

The California Energy Commission (CEC) staff has reviewed the Draft Environmental Impact Report/Environmental Assessment (EIR/EA) for the Mammoth Pacific Geothermal Development Project: Units II and III. The staff offers the following comments for your consideration.

General Comments

Section 5.3.1.4 (Air Quality) of the draft EIS/EA indicates that six identical geothermal electrical generation units--Mammoth/Chance I & II, Mammoth Pacific I, II & III and Pacific Lighting Energy Systems I--will be developed in close proximity to each other and that each unit will produce 12 megawatts (MW) of electricity with a total power output of 72 MW. The CEC has exclusive permitting authority for all thermal power plants 50 MW or greater in capacity (Public Resources Code 25000 et seq.). As a multi-unit project, these units may fall within CEC jurisdiction. We are currently in the process of contacting the developers and gathering information which will assist us in making a determination on jurisdiction. We should be able to resolve this issue within 45 days.

The California Environmental Quality Act guidelines (Sect. 15126) require that an EIR identify and discuss the significant effects of a project. The draft EIR/EA does not consistently specify the significance of adverse impacts identified. In addition, while the document does suggest possible mitigation measures, it should also assess the residual impact level after mitigation, and which measures are actually proposed.

Mr. Daniel Lyster
September 3, 1987
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Biological Resources

The draft EIR/EA fails to provide adequate information on the existing biotic conditions or possible impacts on rare or endangered species or natural communities. The draft EIR/EA cites a "biotic assessment" by Dean Taylor and Richard Buckberg (1987) as the basis for the discussion on vegetation. However, this study was conducted at an inappropriate time of year (winter), without an appropriate level of study for impact analysis (D. Taylor, personal communication, 8/27/87). According to Dr. Taylor, these limitations are stated in his report, which was intended to be only a general scoping study. Although other supporting data were attached as appendices, the "biotic assessment" was not attached.

A detailed rare plant survey report which follows guidelines provided by the California Department of Fish and Game should be prepared to serve as a data base for assessing potential impacts to rare plants. Information should also be provided regarding disturbance to areas identified as "thermal marsh" and mountain meadow communities, as these may be wetlands and thus subject to state and federal policy. All wetland areas should be completely avoided. Wetlands areas that have been degraded without federal permits should be rehabilitated.

The draft EIR/EA should identify wildlife species that occur on or near the project site. Specific information on the occurrence of Sage Grouse on the project site (as opposed to a general discussion about the regional occurrence) should be provided.

Cumulative biological impacts of geothermal development in the Long Valley Geothermal Resource Area are not adequately addressed. A study of the cumulative biological impacts of this and other developments in this area should be completed prior to the approval of any additional power plants, and should be included in the data used to determine the cumulative impacts related to the proposed project.

Air Quality

The document, on pages 5-9 to 5-10, states that construction activities could cause new or continued violations of the state's ambient PM10 standard. This is likely to be considered a significant impact, yet there is no indication that impacts will be mitigated to the extent feasible. Additionally, the document states, on page 5-9, that the facility may emit 1,500 to 6,000 lbs/day of non-methane hydrocarbons. This may also be considered to be a significant impact. It is unclear that this impact will be mitigated to the extent feasible.

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Page 3

Public Health

The draft EIR/EA states, on pages 4-30 to 4-32, that substantial emissions of both H₂S and isobutane could result during upsets of the facility. Ambient concentrations that would result from such events should be compared to levels that are considered acceptable for public exposure. Criteria used to gage such exposures should consider the effects on sensitive members of the general public.

The geothermal fluid released during upsets can contain trace amounts of arsenic, lead, and mercury. The resultant public exposure to these pollutants should also be evaluated.

Noise

From information in the draft EIR/EA it is unclear what project-related noise levels will occur off-site, or if such levels will conflict with proposed land uses around the proposed facility. An analysis of noise levels at the property lines of the proposed facility should be provided, and noise levels that are acceptable for the proposed use of the surrounding lands should be identified and discussed.

Waste

The draft EIR/EA should address methods for disposal of liquid or solid waste that could result from construction or operation of the proposed facility. Some wastes may be hazardous and require special disposal practices.

Visual Resources

The draft EIR/EA states (p. 4-46) that even with mitigations the plant would be noticed by casual observers and the project would therefore be inconsistent with the Visual Management Objective of "retention." However, the text does not state whether this inconsistency would constitute a significant environmental impact. The document should make a determination on this issue.

The document describes (p. 5-14) the cumulative visual effect of the project in combination with the existing Mammoth Pacific I project and the proposed PLES I project. However, it does not assess whether this impact would constitute a significant environmental impact, either before or after mitigation.

Mr. Daniel Lyster
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Page 4

Land Use

The draft EIR/EA states (p. 4-46) that the project is compatible with current County and United States Forest Service plans, with the exception of the applicable visual resource management policies. However, the text does not discuss whether the project would conflict with existing and planned land uses in the area. Conflicts with recreational uses are of particular concern and should be addressed.

The document should assess whether the cumulative land use effect of "transforming several undeveloped areas to industrial uses" (pp. 5-14 to 5-15) would be a significant environmental impact, even though it would be consistent with Mono County and Inyo Forest Plans except for the Visual Management Objectives for the area.

Housing

The EIR/EA states (p.4-48) that construction of some additional housing can be expected due to the project. However, the text does not state whether this additional housing would constitute a significant environmental impact. The document should make a determination on this issue.

The number of temporary and permanent housing units in the area as well as the vacancy rate for each category should be specified. Given the lack of data on how many workers will be from the local area, the population figures used to determine the additional housing required should be calculated on the minimum local employment scenario (p. 4-47). Alternatively, an analysis of workers needed by trade compared to locally available workers in those trades could provide a more specific estimate of non-local employment and thus housing needed.

The document states that "simultaneous construction of two plants could tighten the housing market" (p. 5-14). The document should quantify the effect on the housing market and assess whether this effect would constitute a significant environmental impact. The EIR/EA should also provide the specific reason(s) for including only Mammoth Pacific II & III and PLES I from among the proposed projects in the Mammoth Lakes area in the assessment of cumulative housing impacts.

Economy

A determination should be made as to the significance of the potential depletion of geothermal water at the Hot Creek Fish Hatchery (p. 4-49). The feasibility of the proposed mitigation

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Page 5

measure of heating water with conventional fuels (p. 4-50) should be analyzed. The potential environmental impact of this mitigation should also be considered.

Public Services

The EIR/EA should provide the specific reason(s) for including only Mammoth Pacific II & III and PLES I from among the proposed projects in the Mammoth Lakes area when assessing cumulative impacts to public services (p. 5-3).

The EIR/EA states that the cumulative public service demand caused by the simultaneous construction of two plants "would probably exceed a 'threshold' level and require the addition of fire, police and school personnel" (p. 5-14). These potential impacts should be quantified, their significance assessed, mitigation discussed, and the significance of residual impacts described.

Timber Resources

The EIR/EA should assess whether the specific effect of harvesting timber due to the project (p. 4-52) would be significant either before or after proposed mitigation.

The document should assess whether the cumulative impact of harvesting (p. 5-15) would be significant either before or after mitigation. The EIR/EA should also provide the specific reason(s) for including only Mammoth Pacific II & III and PLES I from among the proposed projects in the Mammoth Lakes area in the assessment of cumulative impacts to timber resources (p. 5-3).

Cultural Resources

The recommendation that "to the extent possible, an effort be made to monitor development activities that may uncover buried cultural deposits" (p. 4-65) is too vague to ensure protection of potential resources. Either a qualified cultural resources specialist should be on site to monitor subsurface disturbance, or an approved training program for employees should be required, with a qualified cultural resources specialist to be called in to assess any resources discovered during construction. If human remains are discovered, the County Coroner must be notified, and if the remains are of Native Americans, a local Native American representative must be consulted as to proper treatment of the remains.

Mr. Daniel Lyster
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Page 6

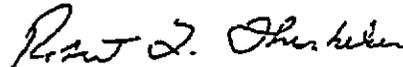
The draft EIR/EA should address the potential depletion of thermal springs as a potential impact to the traditional Native American interests referred to on page 4-66.

Transportation and Access

The traffic, including heavy equipment, created by the project should be quantified. Current traffic levels on local roadways as well as anticipated non-project levels during construction should be quantified. An assessment should be made of the impact of project-related traffic on local traffic conditions, considering the effect of the proposed mitigation (p. 4-66). The potential cumulative traffic impact of constructing more than one geothermal plant in the area at one time (p. 5-16) should be quantified and its significance assessed.

If you have questions or would like clarification on the CEC staff's comments, please contact Sharron Taylor of my staff at (916) 324-3231.

Sincerely,

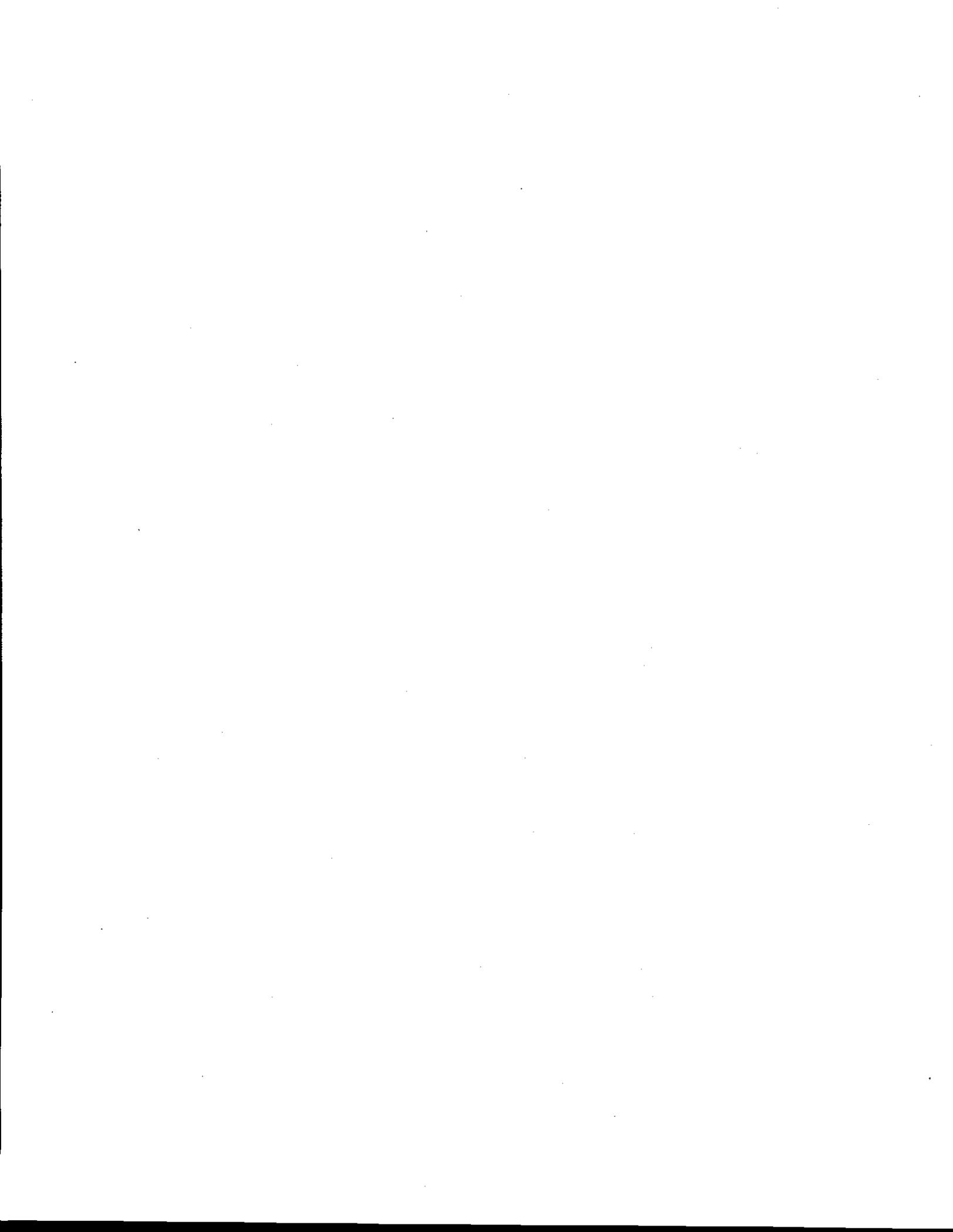


ROBERT L. THERKELSEN, Chief
Siting and Environmental Division

cc: Office of Planning and Research

RLT:GW:st

EXHIBIT 37



FINAL

**MAMMOTH PACIFIC GEOTHERMAL
DEVELOPMENT PROJECT: UNITS II AND III
ENVIRONMENTAL IMPACT REPORT
ENVIRONMENTAL ASSESSMENT**

SCH #86112408

PREPARED FOR:

COUNTY OF MONO
ENERGY MANAGEMENT DEPARTMENT AND

BUREAU OF LAND MANAGEMENT

OCTOBER 1987

ESA
PLANNING AND ENVIRONMENTAL SERVICES

760 Harrison Street
San Francisco, California 94107
(415) 896-5900

1. INTRODUCTION

This document contains summaries of the public comments received on the Draft Environmental Impact Report (DEIR), prepared for the proposed Mammoth Pacific II and III Geothermal project, and responses to those comments.

All substantive comments made at the Draft EIR public hearing before the Planning Commission, September 14, 1987, and all written comments received during the Draft EIR public review period from July 20, 1987, through September 14, 1987, are presented herein by direct quotation, edited to delete repetitive and nonsubstantive material only.

Comments and responses are grouped by subject matter and are arranged by topics corresponding to the Table of Contents in the DEIR. Each group of comments is followed by its response. As the subject matter of one topic may overlap that of other topics, the reader must occasionally refer to more than one group of Comments and Responses to review all information on a given subject. Where this occurs, cross references are provided.

Some comments do not pertain to physical environmental issues, but responses are included to provide additional information for use by decision-makers.

These comments and responses will be incorporated into the Final EIR as a separate document. Text changes resulting from comments and responses will also be incorporated into the Final EIR, as indicated in the responses.

II. LIST OF PERSONS COMMENTING

The set of initials given after each commentor is used to identify who made the comment in Section III, the Comments and Responses. The commentors are listed chronologically.

Frank Stewart and Lisa Jaeger, Private Citizens. Letter to Dan Lyster, Mono County Energy Management Department. August 18, 1987. (FS and LJ)

Dennis J. O'Bryant, Environmental Program Coordinator, Division of Oil and Gas, Geothermal Section, Department of Conservation. Memo to Dr. Gordon F. Snow and Mr. Daniel Lyster. August 24, 1987. (CDOG)

Mike Sorey, Research Hydrologist, U.S. Geological Survey. Letter to Dan Lyster. August 24, 1987. (USGS)

Pete Bontadelli, Acting Director, Department of Fish and Game, The Resources Agency. Memo to Project Coordinator, Resources Agency and to Mono County Energy Management Department. August 26, 1987. (CDFG)

Ellen Hardebeck, Air Pollution Control Officer, Great Basin Unified APCD. Letter to Mr. Dan Lyster, Mono County, Energy Management Department. August 31, 1987. (GBUAPCD)

Robert L. Therkelson, Chief, Siting and Environmental Division, California Energy Commission. Letter to Daniel Lyster, Mono County Energy Management Department. September 3, 1987. (CEC)

Hamilton Hess, Geothermal Coordinator, Sierra Club. Letter to Daniel Lyster, Mono County Energy Management Department. September 6, 1987. (SC)

Donald C. Liddell, Mammoth Pacific. Letter to Daniel Lyster, Mono County Energy Management Department. September 10, 1987. (MP) Enclosures included reports and comments from Cascadia-Pacific, GeoThermex, and Mesquite Group.

Frank Stewart speaking for Hamilton Hess, Sierra Club. Mono County Planning Commission, DEIR public hearing comments. September 14, 1986.

Robert Brown, CDFG, Bishop, Mono County Planning Commission. DEIR public hearing comments, September 14, 1986. (CDFG)

Lisa Jaeger, private citizen, Mono County Planning Commission. DEIR public hearing comments, September 14, 1986. (LJ)

Bureau of Land Management and U.S. Forest Service submitted an annotated copy of the DEIR at the DEIR public hearing, September 14, 1986. (BLM/USFS)

Dan Dawson, Commissioner, Mono County Planning Commission. DEIR public hearing comments. September 14, 1986. (DD)

Bob Kimball, Commissioner, Mono County Planning Commission. DEIR public hearing comments. September 14, 1986. (BK)

Sydney Quinn, Commissioner, Mono County Planning Commission. DEIR public hearing comments. September 14, 1986. (SQ)

George Lucas, Chief, Long Valley Fire Protection District. September 14, 1987.
Memo to Mono County Planning Department. (LVFPD)

Bureau of Land Management and U.S. Forest Service comments were provided in an annotated copy of the DEIR submitted at the public hearing September 14, 1987. It is not reproduced in this document, but the substantive comments appear in Section III, Comments and Responses. (BLM/USFS)

III. COMMENTS AND RESPONSES

GENERAL COMMENTS

COMMENT:

Six identical geothermal electrical generation units--Mammoth/Chance I & II, Mammoth Pacific I, II & III and Pacific Lighting Energy Systems I--will be developed in close proximity to each other and that each unit will produce 12 megawatts (MW) of electricity with a total power output of 72 MW. The CEC has exclusive permitting authority for all thermal power plants 50 MW or greater in capacity (Public Resources Code 25000 et seq.). As a multi-unit project, these units may fall within CEC jurisdiction. We are currently in the process of contacting the developers and gathering information which will assist us in making a determination on jurisdiction. We are currently in the process of contacting the developers and gathering information which will assist us in making a determination on jurisdiction. We should be able to resolve this issue within 45 days. (CEC)

RESPONSE: The six geothermal plants would not be identical in size or design. Otherwise, the comment is noted.

COMMENT:

The California Environmental Quality Act guidelines (Sect. 15126) require that an EIR identify and discuss the significant effects of a project. The draft EIR/EA does not consistently specify the significance of adverse impacts identified. In addition, while the document does suggest possible mitigation measures, it should also assess the residual impact level after mitigation, and which measures are actually proposed. (CEC)

RESPONSE: Section 5.1 of the DEIR lists significant adverse impacts. The anticipated effect of each mitigation, where it can be determined, is given in Chapter 4. It is up to Mono County to choose conditions and required mitigations for the project.

COMMENT:

EIR should include summary of unmitigable significant impacts. (DD)

RESPONSE: An edited version of the summary table appearing in Chapter 1 of the DEIR and included here indicates whether or not an impact is significant.

Environmental Category

Geology, Geologic Hazards and Soils

Major Impacts

The proposed project is located in an area of hydrothermally altered rock and the well sites may be affected by unstable ground.

The proposed project is in a geologically active area and may be affected by fault rupture.

The proposed project area may be affected by seismic groundshaking.

The proposed project may be exposed to volcanic activity.

Degradation of water quality in Mammoth Creek and Hot Creek is likely to occur due to erosion and sedimentation impacts during construction.

Water Quality and Hydrology

Accidental spills of geothermal fluid temporarily could raise the temperature of Mammoth Creek and Hot Creek. This could be caused by a well blowout or by a pipeline rupture during operation.

**Mitigation Measures
(Keyed to Specific Impacts)**

A geotechnical report for the drill sites will be required by CDOG prior to the issuance of a permit.

Site major facilities away from known fault traces. Design facilities to withstand fault offset without failure.

Develop an emergency spill containment plan prior to operation.

Design all project facilities to withstand the predicted levels of groundshaking (horizontal acceleration of 0.4 to 0.6g) without structural failure.

Establish emergency shutdown procedures. Inspect and maintain shutdown controls regularly.

Adhere strictly to the Lahontan Regional Water Quality Control Board (RWQCB) guidelines for the Mammoth Creek watershed.

Disturb no more than one-quarter acre of soil before implementing temporary erosion control measures.

Construct all roads to U.S. Forest Service (USFS) standards.

Build new access roads following hillside contours.

Stockpile soil for use in revegetation. Revegetate using native grasses, shrubs, and trees.

Have detailed blowout contingency plan. Regularly test and maintain automatic pump shutdown system. Adequately maintain containment dikes and catchment basins. Install valves or sluice gates at culverts under Hot Spring Road and State Route 703 to prevent hot water reaching Mammoth Creek.

Expected Result of Mitigation

The potential impacts of drilling and production can be reduced by proper well siting and well construction determined by the geotechnical report.

Effects of fault rupture would be reduced or eliminated.

Effects of groundshaking would be reduced or eliminated.

Impacts of a large eruption are essentially unmitigable. Emergency shutdown would prevent hazardous conditions during periods when operators cannot reach the power plants.

Erosion and sedimentation impacts would be substantially reduced.

Temperature effects would be minimized.

Significant After Mitigation

No

No

No

No

No

No

Environmental Category

Major Impacts

Mitigation Measures
(keyed to Specific Impacts)

Expected Result of Mitigation

Significant After
Mitigation

Water Quality and Hydrology (cont.)

Surface water could be contaminated by runoff from soils that are contaminated by leakage or spills of fuels and other chemical compounds used on the site.

Maintain site and vehicles regularly.

Significant contamination of soils or surface runoff would be prevented.

No

Store and handle potentially hazardous materials properly, following RWQCB requirements.

Have a detailed spill contingency plan which should include:
1) immediate removal of spilled fluid by pump trucks for proper disposal;
2) construction of containment dikes with heavy equipment;
3) removal of contaminated soils;
4) immediate cleanup; and
5) notification of appropriate public agencies.

Impacts on surface thermal features resulting from production/injection operations at the proposed project are difficult to predict. Experts studying the geothermal reservoir do not agree on how fluids move within the reservoir. One model (Upwelling/Fracture Flow) postulates that deep upwelling from separate sources feeds multiple reservoirs, so that pumping at Casa Diablo would have no effect on the reservoir(s) at Hot Creek. The second model (Lateral Flow) proposes a source of geothermal fluid in the southwestern part of the caldera, with fluid movement toward the east. Calculations done using this model indicate that, using the information currently available about reservoir characteristics, there would probably be no effect on reservoir pressure or temperature beneath Hot Creek; however, there is the possibility that due to the lack of information about reservoir characteristics, the numerical modeling predictions are inaccurate and there could be an effect on the geothermal resource at Hot Creek Hatchery or Hot Creek Gorge.

Establish a program of fluid monitoring (see Table 4-3) including observation well just east of MP II & III well fields. Use reservoir management techniques (changes in production/injection) in response to observations mitigate impacts before effects reach Hot Creek.

Monitoring may supply early warning of effects on reservoir and may help distinguish impacts due to natural causes (such as tectonic strain and seasonal precipitation amounts) from impacts attributable to power plant operations.

Potentially

If spring flows or temperatures were reduced at Hot Creek Hatchery or Hot Creek Gorge due to MP II & MP III power plant operations, Southwest Pacific could:
1) supply hot water by pumping geothermal fluid and delivering it to the hatchery; and
2) supply lost flow of hot water to the bathing area.

If geothermal fluid is delivered to Hot Creek Hatchery, impacts at the hatchery would be mitigated but either pumping would increase or injection would decrease. If a well were constructed at Hot Creek Gorge, lost flow would be replaced, but scenic value and visitor appeal as it currently exists would not be restored.

Noise: Construction

Temporary noise from construction-related activities may affect nearby wildlife and occasional recreational users of adjacent forest areas.

Use muffling devices on construction equipment.

Noise level would be reduced on diesel-powered equipment by up to 10 dBA.

No

<u>Environmental Category</u>	<u>Major Impacts</u>	<u>Mitigation Measures</u> (Keyed to Specific Impacts)	<u>Expected Result of Mitigation</u>	<u>Significant After Mitigation</u>
Noise: Construction (cont.)	A temporary increase in traffic noise along State Route 203 and Hot Springs Road could affect wildlife and passers-by.	Establish vanpools or carpools and limit construction activities (except drilling) to 7:00 a.m. to 4:00 p.m.	This would reduce the total number of trips and would also reduce the noise levels at night.	No
Noise: Drilling	Noise levels of 77 dBA, Leq are estimated for drilling. A total of 16 wells are planned, each requiring at least 12 days (24 hours per day) of drilling time.	Drill no more than one well at a time. Follow OSHA and GRO 4 regulations.	Noise levels would not exceed 65 dBA at the lease boundary or 0.5 mile from the source, whichever is further.	No
Noise: Operation	The combined noise level if MP 1, MP II and MP III were operating would be 4 to 5 dBA louder than MP 1 alone, an increase noticeable to people and wildlife in the vicinity.	Noise-muffling devices should be installed at all three power plants. Apply GRO 4 standards to all three power plants.	Noise levels would be reduced by 10 to 12 dBA, Leq. at each plant. Noise levels would not exceed 65 dBA at the lease boundary or 0.5 mile from the source, whichever is greater.	No
Air Quality: Construction	Earthmoving and construction activities would generate large amounts of dust and small amounts of CO, NO ₂ , SO ₂ , and hydrocarbons. This may create a temporary health hazard or degrade visibility in nearby areas.	Wet down construction sites during development at least twice a day. Cover stockpiled materials and loaded trucks and do not overfill trucks. Minimize the area disturbed and revegetate promptly. Minimize traffic and speeds at construction sites. Clean up off-site spills promptly. Use water-based paints and architectural coatings where feasible.	The amount of dust would be reduced by up to 50%. Dust would be further reduced. Both dust and engine exhaust would be reduced. Evaporation of pollutants would be limited.	No
Air Quality: Drilling and Testing	Required cleanout and testing would result in the release of up to 0.9 kg/hr of H ₂ S for a two- to four-hour period at each well. A blowout during well drilling could last longer. A slight potential for road icing and induced fog clouds would exist during flow testing.	Limit drilling, cleanout and testing activities to one well at a time. Conduct flow tests under atmospheric conditions that would minimize induced icing and fog clouds.	No more than one well would contribute to the H ₂ S emissions. The potential for hazardous conditions would be reduced.	No
Air Quality: Operational Phase	A five-minute spill of geothermal fluid supplying one power plant (5,000 gpm) would result in emission rates of H ₂ S of approximately 9 kg/hr. This would exceed the Air Pollution Control District (APCD) and state one-hour standards and would cause irritation to eyes and respiratory tract.	Maintain emergency shutdown equipment so that flow would be stopped promptly.	Hazardous levels of H ₂ S would be produced for a brief period.	No

Environmental Category

Air Quality (cont.)

Major Impacts

Isobutane working fluid would be released from each plant at a rate similar to the loss at MP 1 of 4.4 cubic feet per minute or 1000 pounds per day.

A major rupture of the isobutane system could cause release of 200,000 cubic feet of working fluid to the atmosphere.

Mitigation Measures
(Keyed to Specific Impacts)

Great Basin Unified APGD would require remedial control action with regard to the release of isobutane to the atmosphere.

Add an appropriate level of odorant to the isobutane.
Install hydrocarbon sensors and alarms to alert personnel.

Use air-cooled condenser fan to dilute and disperse leaked vapors.
Use vacuum trucks to collect the liquid working fluid.

If the cloud of vapor were to ignite, relief valves and discharge valves should be opened to reduce the quantity of material available for combustion and the material should be burned off.

Avoid damaging existing vegetation whenever possible. Utilize areas which are already disturbed.

Revegetate all disturbed areas with native trees, shrubs, and grasses. Newly planted seedlings should be drip irrigated to promote growth and fenced for protection. Their survival should be monitored.

Adjust the locations of wells to avoid botanically sensitive areas, all of which are located on private property. Rhyolite buckwheat scrub communities should be fenced for protection.

Follow the recommended mitigation measures for noise.

Construct crossing ramps over pipelines or bury short segments. Design fencing and pipelines to avoid a funnelling effect.

Expected Result of Mitigation

No more than 250 pounds per day of isobutane would be released.

Plant personnel would be informed of the leak immediately.

Vapors would be dissipated or removed.

The loss of natural habitat would be lessened.

Without irrigation, seedlings of Jeffrey pine could be expected to reach between five and eight feet in height with a diameter at breast height of 0.6 to 2.2 inches after ten years.

Damage to sensitive plant communities would be minimized.

Noise levels would be reduced to 65dBA at the lease boundary or 0.5 miles, whichever is further. This may lessen impacts to songbird and deer populations, but the effect is not certain.

Physical barriers to deer migration would be minimal.

Significant After Mitigation

No

No

No

No

No

No

Vegetation

Development of the proposed power plants would remove up to 26 acres of available natural habitat from the area.

Botanically sensitive rhyolite buckwheat scrub communities are located near proposed facilities and may be affected by pipeline construction.

Terrestrial Wildlife

Noise and human activity may reduce songbird density near the power plants and may cause migratory deer to avoid the area.

Deer pass through the area on their twice yearly migrations between summer and winter ranges. Human activity in the Mammoth Lakes area is putting increasing pressure on their traditional migratory routes.

<u>Environmental Category</u>	<u>Major Impacts</u>	<u>Mitigation Measures (Keyed to Specific Impacts)</u>	<u>Expected Result of Mitigation</u>	<u>Significant After Mitigation</u>
Terrestrial Wildlife (cont.)		Require the project sponsor to contribute toward protection of migration routes or winter range.	Deer habitat would be protected.	
Aquatic Resources	Increased sedimentation in Mammoth and Hot Creeks may result from grading new roads and building surfaces. Elevated turbidity levels would clog and irritate gill structures and interfere with respiration, feeding, and swimming capabilities of resident fish and aquatic invertebrates.	Implement the erosion and sedimentation control measures described under Soils and Hydrology.	Turbidity effects would be reduced.	No
	Accidental spills or leakages of organic compounds used during drilling and construction could cause adverse effects on aquatic resources.	All compounds potentially harmful to aquatic organisms should be stored in secure containers within the bermed areas so that leaks would be contained. Follow requirements of the RWQCB.	The potential for accidental spills or leakages to affect aquatic resources would be greatly reduced.	No
	Thermal shock from a large spill of geothermal fluid could cause some mortality of aquatic organisms in Mammoth Creek.	See mitigation under Hydrology.	The Mammoth/Hot Creek fishery would not be adversely affected.	No
	There is a possibility that the production of geothermal fluid at the Project may eventually decrease the temperature or amount of thermal water reaching Hot Creek Hatchery. This would adversely affect hatchery operations.	Supply thermal water. Stop or reduce production at the geothermal plants.	This mitigation measure will supply the necessary thermal water, but either the production reservoir or the injection reservoir would be further depleted. An investment in equipment to achieve the appropriate mix of pumped and spring water would be required. Results would not be felt immediately because of the slow response time within the geothermal reservoir.	No
Visual Resources	The proposed power plants would be visible from scenic highways and would conflict with the Visual Management Objectives of the USFS for federal land surrounding the project.	Use existing vegetation to screen facilities. Lay out well pads and roads so that mature trees are preserved. Revegetate disturbed soil areas promptly. Plant native trees and shrubs to screen equipment yards and accessory structures, and the lower parts of major structures. Use rough textures and neutral earth-tone colors for exterior surfaces. Minimize exterior structural light.	The power plants would be less conspicuous; however, they would still be noticed by casual observers and would be inconsistent with the USFS Visual Management Objectives for the vicinity.	No

Environmental Category	Major Impacts	Mitigation Measures (Refer to Specific Impacts)	Expected Result of Mitigation	Significant After Mitigation
Visual Resources (cont.)		Insert redwood laths in chain link fencing.		
		Apply the above mitigation measures to the MP 1 plant.		
		Locate the plant 400 to 500 feet west of the proposed plant site.	Existing mature trees would partially screen the power plants.	
Land Use and Planning	The addition of two power plants and their appurtenant features would increase the industrial nature of the area, increase erosion, and remove some range and timber land.	See Section 4.1.1.1. Soils and Erosion; Section 4.1.2.1, Vegetation; Section 4.1.3.1, Visual Resources; Section 4.1.3.3, Range; and Section 4.1.3.4, Timber.	The use is compatible with County plans in effect when the application was filed and present USPS plans with the exception of the Visual Management policies discussed above.	See Visual Resou
Employment, Population and Housing	Temporary construction activities are expected to average 48 workers over a nine-month construction period for each power plant. During operation, six new operators would be required for each power plant.	Schedule construction during the summer.	More housing would be available.	
		Hire workers who already live in the area.	Demands for housing would be minimized.	
Economics	In the unlikely event of depletion of geothermal water at Hot Creek Gorge and Hot Creek Hatchery, there would be a reduction in employment, retail sales, and rentals, increasing the severity of the unbalanced winter/summer tourist economy.	See mitigation recommended in Section 4.1.1.2, Water Quality and Hydrology.	Although these mitigations could eliminate impacts at Hot Creek, there is still the possibility due to the uncertain knowledge about the geothermal reservoir, that impacts could occur.	Potentially
	Demand for general county fiscal expenditures would increase due to the need for more community services by the increased residential population.	Increase local hiring. Adjust application fees, charge fees for services, assess impact fees and user fees, and make maintenance agreements to cover costs.	Expenses to the County would be reduced.	No
	For both MP II and III, property tax revenues would increase by approximately \$470,000 per year.	None is necessary.		
Community Services: School	Increased employment during construction and operation may result in an increase in overcrowding at elementary schools.	Assess an impact fee on power plant construction.	Additional funding for schools would be available.	No
		Use local labor.	There would be fewer new students.	
Community Services: Sheriff	There would be potential for vandalism at the facility.	Power plant facilities and each well site should be enclosed with a chain-link fence to keep casual visitors away from equipment and operations.	Opportunities for vandalism would be reduced.	No

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<u>Environmental Category</u>	<u>Major Impact</u>	<u>Mitigation Measures (Keyed to Specific Impacts)</u>	<u>Expected Result of Mitigation</u>	<u>Significant After Mitigation</u>
Community Services: (cont.)				
Community Services: Health Care	The health care services of Mono County are not expected to be significantly impacted during construction or operation of the facilities. However, local facilities are not equipped to handle victims of severe scalding or burns.	Follow the safety regulations as administered by OSHA. Drill wells in conformance with GDOG requirements. Provide standard first aid supplies and instruct personnel on emergency procedures and locations of emergency supplies and services. Insulate surface pipelines. Incorporate geothermal development emergency needs into County emergency response plan. Develop evacuation procedures for burn victims.	The risk of accidental injury or death would be reduced. First aid would be immediately available. Risk of burn would be reduced. County agencies would be prepared for prompt response. Burn victims would be properly treated.	No
Community Services: Fire	Construction activities would pose the danger of shrub or forest fires. During plant operations, the possibility that the isobutane working fluid might be released to the atmosphere poses a serious fire hazard.	Implement the fire control measures prepared as part of the project. See Section 4.1.3.2.4, Community Services. Mammoth Pacific should submit a detailed fire protection plan to the Long Valley Fire Protection District and the Mammoth Lakes Fire Department. Contribute to construction of a fire station closer to the project.	The fire hazard would be reduced. Response would be coordinated, prompt, and appropriate. Emergency response time would be shortened.	No
Community Services: Roads	County and USFS roads may be damaged by heavy construction traffic.	Establish agreements for the repair of damage to the County and USFS road systems caused by project activities.	The costs of road repair would be paid by the project sponsor.	No
Recreational Resources	There is a possibility that the thermal springs at Hot Creek Gorge could be depleted as a result of operating the MP II & III plants. The California trout stocking program would be adversely affected if the temperature of water used at Hot Creek Hatchery were lowered by more than 2°F.	See mitigations in Hydrology, Section 4.1.1.2. See Aquatic Resources, Section 4.1.2.3, and Zooplankton, Section 4.1.3.2, for descriptions of hatchery operations. See Hydrology, Section 4.1.1.2 for mitigation of effects on geothermal resource.	Although the mitigations are likely to prevent adverse impacts, there remains the possibility that, due to uncertainties about the nature of the geothermal reservoir, adverse impacts could occur. The mitigations suggested could restore the trout stocking program.	Potentially No

<u>Environmental Category</u>	<u>Major Impacts</u>	<u>Mitigation Measures (keyed to Specific Impacts)</u>	<u>Expected Result of Mitigation</u>	<u>Significant After Mitigation</u>
Recreational Resources (cont.)	A spill of geothermal fluid may temporarily, adversely affect fishing in Hot Creek.	See mitigation in Section 4.1.1.2.3, Hydrothermal Resources, to confine the spill. Restock affected portions of stream.	Confining the spill would minimize the impact.	No
	Recreationists driving, cycling, or jogging past the project area may be adversely affected by the noise and industrial appearance of the facility.	See Section 4.1.1.3, Noise, and Section 4.1.3.1, Visual, for suggested mitigations.	Impacts would be reduced.	No
	The power plants would attract attention.	Install an informational display.	The public would learn about geothermal resources and how they are used in Mono County.	No
Timber Resources	Merchantable-size Jeffrey pine would be harvested during the clearing of about 15 acres for the project.	Site well pads and pipelines in natural openings and clearings. Orient clearings which result from project development so that clustering of small non-merchantable trees is avoided.	The minimum amount of timber would be harvested.	No
		The operator should purchase all merchantable timber when harvested at prevailing market rate.	The timber owner would be compensated for harvested timber.	
		Replant with natural vegetation wherever possible and fence revegetated areas.	The timber resource would be replaced.	
Range Resources	Construction of the Proposed MP II & III project would remove approximately 23 acres of range land from active use.	Pavegate all non-occupied cleared range land. Fence revegetated areas to protect vulnerable plants.	Some of the range land would eventually be recovered.	No
Cultural Resources	Historic and prehistoric cultural resources could be adversely impacted by the proposed development.	Perform an archaeological assessment of the area to determine the exact areas that would be impacted.	Cultural resources would be protected or only slightly affected.	No
		Locate wells in areas where they would have no impact or a low impact. If the assessment indicates significant cultural resources in the area and no practical mitigation alternative exists, expensive data recovery investigations would be recommended.		
	The Bishop Elders have voiced concerns over resources important to Native Americans.	The project sponsor has agreed that Native Americans would have continued access to resources important to their culture.	Native American interests would be protected.	No
Transportation and Access	Heavy equipment used during construction could worsen traffic congestion at the Highway 195/State Route 203 interchange during busy periods.	Direct project traffic off Highway 195 to Hut Springs Road at the intersection south of State Route 203.	The potentially busy intersection would be avoided by project construction traffic.	No

COMMENT:

In terms of scientific analysis and professional quality, this Draft EIR is considerably superior to other environmental documents that have been prepared for Mono County for geothermal project proposals. While it generally reflects a pro-project bias (which an EIR should not reflect) it does draw a number of cautionary conclusions from the evidence and data upon which it is based. It concludes that too little is known about the hydrothermal reservoir, or reservoirs, in the Casa Diablo-Hot Creek region to be able to predict the consequences for Hot Creek and the state fish hatchery if the proposed Mammoth Pacific project is to go forward (pages 2-4; 3-17, 19, 20; 4-12, 15; and 5-2). It acknowledges that if the thermal springs at Hot Creek were to be degraded as a result of project operations no mitigations are available for the loss of this "unique recreational resource" (pages 4-50 and 61). It states that the Forest Service policy and standards for visual quality retention and of the Mono County Scenic Element will be violated in the Casa Diablo area if Mammoth Pacific II and III are built (pages 3-42, 49; 4-44, 46; and 5-1). In its brief review of the cumulative impacts to be anticipated from the one presently operating and the five proposed geothermal power plants in the region, the report concludes that the overall and long-term impacts from their construction and operation could be significant with respect to water quality (page 5-6), pressure changes in the geothermal reservoir(s) (page 5-7), degradation of hot springs in the Hot Creek Gorge with the consequent loss of its recreational value (page 5-15), the disturbance of deer migration (page 5-11), and in the creation of an industrialized atmosphere in the region (page 5-14).

These basic findings reached in the DEIR raise serious questions about the justifiability of the proposed project. In exchange for a meagre 24 MW of electricity produced for the relatively short period of thirty years, it would contribute to at least moderate -- and perhaps disastrous -- degradation of one of the nation's two or three most heavily used, appreciated and needed mountain recreational playgrounds and, together with the other presently proposed geothermal project in Long Valley, would turn the energy producing area into an industrial park. Unfortunately, the DEIR ignores these fairly obvious conclusions to be drawn from its own findings and it justifies the project with gratuitous claims that all of the problems, except for the possible degradation of the state fish hatchery at Hot Creek and loss of visual quality, can be mitigated. The existing facility and its associated problems of the stream pollution and noise, especially, should be removed in the DEIR. (SC)

RESPONSE: Noted.

COMMENT:

Pages 5-2 and 5-16. The discussion of cumulative impacts from the several geothermal projects presently operating or proposed for the area is much needed and is a good beginning. A more comprehensive study of cumulative impacts from all geothermal projects together with others, such as the airport expansion project is urgently needed. The study needs to be free of a pro-development bias, under which the present brief discussion suffers, and should be undertaken by a consultant employed jointly by the County and the federal government and paid for by all project applicants in the Long Valley region proportionate to the costs of their projects. (SC)

The Department recommends the "No Project" alternative until a cumulative impact analysis of all geothermal projects in the Long Valley KGRA is completed. We can no longer concur with the piecemeal consideration of similar projects or project phases that may result in cumulative long-term adverse impacts to the important biological, hydrological, and recreational resources of the area. (CDFG)

A comprehensive cumulative analysis is needed. (LJ)

RESPONSE: Noted.

COMMENT:

Pages 2-5 to 2-8. Further details are needed with regard to proposed well sites: terrain, cut slopes, quantities of soil to be removed, slope stability, proximity to faults. (SC)

RESPONSE: The wells are permitted by California Division of Oil and Gas (CDOG) and would be sited after completion of the geotechnical report required by CDOG. The locations shown in Figures 2-2 and 2-7 are approximate. Additional details are unknown at present.

PROJECT DESCRIPTION

COMMENT:

Pages 2-4 and 2-5. What about Chevron tank farm, county junk yard, power lines, gravel pits, airport?... The statement that "Development at the site has the potential to disrupt the traditional migration routes of many of these deer", is misleading. (BLM/USFS)

RESPONSE: This section refers to issue raised by respondents to the NOP. It is not a description of the existing conditions.

COMMENT:

Page 2-5. What is surface infrastructure? (BLM/USFS)

RESPONSE: Mainly access roads and surface drainage features.

COMMENT:

Page 2-6. Table 2-1 should include all pipeline, transmission lines, roads and facilities and federal land as being under the jurisdiction of the BLM. (BLM/USFS)

RESPONSE: Acknowledged.

COMMENT:

Page 2-9 and 2-12. The short-term flow test isn't described in enough detail. (BLM/USFS)

RESPONSE: The well would flow without being pumped (up to 500 gpm) into an open 21,000 gallon tank for two to four hours.

COMMENT:

Page 2-7, Figure 2-2. Well MP 12-32 is incorrectly identified in the figure as MP 12-52. (MP)

RESPONSE: Agreed.

COMMENT:

Page 2-8. What are the locations of the additional wells that may be required? What permitting process will be followed when and if these wells are proposed? (SC)

RESPONSE: Additional well locations are unknown. See page 2-6 of the Draft EIR for necessary permits and approvals.

COMMENT:

Page 2-17. How big would the reverse osmosis unit be? The size of a shed or a house? (BLM/USFS)

RESPONSE: It would be small compared to other features of the power plant.

COMMENT:

Page 2-17. The 50,000 to 500,000 gallon range for the water tank is very wide and could be important for assessing resource impacts (i.e., visual). (BLM/USFS)

RESPONSE: Noted.

COMMENT:

Page 2-20, third paragraph. "The sumps would be drained of liquids and these liquids would be trucked to a reinjection well or, if toxic, disposed of at the Class II waste site." Clarification is needed on this statement. The geothermal injection wells are permitted by the Division of Oil and Gas. However, the injection wells are only permitted to inject produced geothermal fluids. If the sump liquids are to be injected into the geothermal injection wells, waste discharge requirements may be required by the Regional Water Quality Control Board; this operation is not covered by the Division of Oil and Gas permit. (CDOG)

RESPONSE: Sump muds would not be injected. The sentence should read: "The sumps would be drained of liquids and these liquids would be disposed of consistent with RWQCB regulations. If toxic, they would be disposed of at a Class II waste site."

COMMENT:

Page 2-20. Sump muds should not be left in the sumps but should be disposed of at a Class II waste site if toxic. (FS & LJ)

RESPONSE: Noted.

ALTERNATIVES

COMMENT:

Alternatives are not well developed. Should discuss other alternatives and alternative mitigation measures. (DD)

The Alternatives section of the report fails to meet the requirements of the California Environmental Quality Act, whereby a full discussion of reasonable alternatives must be provided (CEQA Guidelines, Section 15126(d)). The DEIR confines itself to a discussion of the "no project" alternative, and this only from the standpoint of financial loss if the project is not implemented. (SC)

RESPONSE: Two alternatives are discussed in the document: The Alternative Location (and its slightly different power plant design) and the No-Project Alternative. Alternatives could have included different geothermal power plant design (water-cooled), power plants using a different energy source, a larger geothermal project, or a smaller geothermal project. The water cooled plant was not considered because of its consumptive use of water. A power plant using another source of energy would be infeasible in the location. Larger geothermal plants would require larger well fields and would likely require acquisition of additional leases which may not be available. The only alternative which is truly feasible is a smaller project, and that analysis can be obtained easily from the existing DEIR. MP II and MP III would be identical plants - each would account for about half the impact of the total project, so it is not necessary to analyze a smaller project as a separate alternative.

There would be no environmental impacts if there were no project. The only impacts would be socioeconomic, so those are the impacts specified for the No-Project Alternative.

COMMENT:

Page 2-22. Why is a different power plant location proposed for the Ormat alternative? (SC)

Page 2-22. It is confusing to combine the alternate plant design with the alternate location. The design is not linked with the location, is it? (BLM/USFS)

RESPONSE: The Ormat units are larger than the radial flow turbo-expander units and the would not fit on the proposed site. Only the alternate site could be used if the Ormat design were selected.

COMMENT:

Page 2-23, Figure 2-7. Well MP 12-32 is incorrectly identified in the figure as MP 12-52. The production pipeline extending from the proposed site to the alternative site is not shown on the figure; however, it would parallel the existing plant injection pipeline route to the MP II & III alternate sites. (MP)

RESPONSE: Acknowledged.

COMMENT:

No-Project Alternative should be pursued.

RESPONSE: Noted.

PHYSICAL ENVIRONMENT

GEOLOGY, GEOLOGIC HAZARDS AND SOILS

COMMENT:

Page 4-5. There is some current evidence (USGS) that slight amount of subsidence may be occurring - I suggest you make requirements consistent with our GRO 4 #8 which we will be requiring on adjacent land. It is not burdensome and good early warning. (BLM/USFS)

RESPONSE: Noted. For information, GRO Order 4 #8 reads as follows:

"8. Subsidence and Seismicity. Surveying of the land surface prior to and during geothermal resources production will be required for determining any changes in elevation of the leased lands. Lessees shall make such surveys as required by the Supervisor to ascertain if subsidence is occurring. Production data, pressure, reinjection rates, and volumes shall be accurately recorded and filed monthly with the Supervisor as provided in 30 CFR 270.337. In the event subsidence activity results from the production of geothermal resources, as determined by surveys by the lessee or a governmental body, the lessee shall take such mitigating actions as are required by the lease terms and by the Supervisor."

"If subsidence is determined by the Supervisor to present a significant hazard to operations or adjoining land use, the the Supervisor may require remedial action, including but no limited to, reduced production rates, increased injection of waste or other fluids, or a suspension of production."

COMMENT:

Page 4-1, (summarized on page 1-3), Environmental Category, Geology, Geologic Hazards, and Soils.

The following statements about the hydrothermally altered rock at, and near the proposed drill sites should be included. The area of concern has a history of impacts from previous drilling activity.

Major Impacts. The proposed project is located in an area of hydrothermally altered rock and the well sites may be affected by unstable ground.

Mitigation Measures. A geotechnical report for the drill sites will be required by the Department of Conservation, Division of Oil and Gas, prior to the issuance of a permit. This report should be included in the Final EIR.

Expected Results of Mitigation. The potential impacts of drilling and production can be reduced by proper well siting and well construction determined by the geotechnical report. (CDOG)

RESPONSE: The comment is correct and should be inserted immediately after the heading 4.1.1.1.1 Geology and Geologic Hazards, except for the condition that the geotechnical report be included with Final EIR. It is likely that the FEIR will be published before the geotechnical study is complete.

COMMENT:

Page 4-4, top of page. It is also necessary to design and build all facilities in such a way as to protect the natural environment. (SC)

RESPONSE: Agreed. Add the phrase "and to protect the natural environment" at the end of the last sentence in the paragraph.

COMMENT:

Page 4-8, second bullet. All disturbed areas should be stabilized at the latest by October 1st. (SC)

Page 4-8, third bullet. All work performed between October 15th and May 1st should be conducted in such a manner as to be stabilized in four hours. A winter storm can have come and gone in 48 hours. (SC)

RESPONSE: The listed mitigations are requirements of the Lahontan Regional Water Quality and Control Board developed for construction sites in the Mammoth Lakes area.

HYDROLOGY AND WATER QUALITY - GENERAL COMMENTS AND MONITORING PROGRAM

COMMENT:

A definitive description of hydrology should be given. (SQ)

RESPONSE: Experts do not agree about the hydrology. The description given in the Draft EIR is a summary of the two basic models which have been used to describe how the subsurface fluids behave.

COMMENT:

A Long Valley Technical Advisory (Hydrological) Committee is being formed under the auspices of the Mono County Energy Department to provide a monitoring plan to assure

the protection of all environmental concerns resulting from geothermal development. By means of this letter, the Department requests that effective enforceable safeguards be built into the monitoring plan to protect the jeopardized natural resources. (CDFG)

The probable relationship between surface flow, shallow groundwater, constant temperature springs, and the geothermal fluid must be assessed to the present "state of knowledge" or "state of the art" and/or state of risk or uncertainty. (CDFG)

Page 4-21: The proponent should participate in a hydrologic monitoring program at the outset, rather than at a later time when decreased spring flows or temperatures at either the fish hatchery or Hot Creek area were noticed.

The irreplaceable value of the Hot Creek Gorge is illustrated by the feeble attempt to propose an adequate mitigation. Once the Gorge is affected in a negative manner, a valuable recreational resource is lost for the foreseeable future. This fact reinforces the need for all geothermal proponents to participate in a detailed hydrologic monitoring program. (FS & LJ)

If the geothermal component of water at the hatchery or Hot Creek Gorge decreases, it should not be the County's responsibility to prove that use of the resource for power generation has caused the loss. The burden of proof should rest with the power plant owners and operators to prove that the power plants are not responsible. (LJ; BK)

Page 5-20: Should add limitation on pumping rates, relocation of injection or ultimately plant shut down. Also potential effects on Hot Creek Hatchery could be detected by the implacement and maintenance of a hydrologic monitoring network. (BLM/USFS)

Page 3-17, paragraph 4: Reference is made to our considering a proposal to greatly improve the quality of such data. Mammoth-Pacific is currently carrying out a comprehensive program to enhance and upgrade the geothermal resource monitoring instrumentation of the operating Mammoth-Pacific geothermal power plant in order to provide highly accurate and continuous reservoir data, including capillary tubes which are being installed to provide downhole pressure measurement with an accuracy of ± 0.1 psi. Additional instrumentation will provide the following data: Produced fluid temperature at each well (± 0.2 F); injected fluid temperature at each well (± 1.0 psi); and injection fluid pressure at each well (± 1.0 psi). All data will be transmitted to an onsite computer for processing. The upgraded reservoir monitoring and data acquisition system should be completely operational by October 1, 1987. It is our intention to provide similar instrumentation for MP II, MP III, and the Long Valley Hydrological Advisory Committee ("LVHAC," formerly Long Valley Technical Advisory Committee) monitoring well which will greatly improve the degree of accuracy and overall quality of reservoir data obtained from power plant operations at Casa Diablo. (MP)

Page 4-19, Table 4-3: Mammoth-Pacific is actively participating in the LVHAC and has attended all organizational meetings, including the meeting of August 6, 1987, at which Mammoth-Pacific agreed to participate in the drilling of a monitoring well on the adjoining property. The location was acceptable to all the experts present. By being on the far edge of the established Casa Diablo geothermal reservoir, the monitoring well will provide very early warning of any significant changes taking place within the reservoir. At the same meeting, we supported the general area-wide monitoring program which was

proposed by the members. We believe that such monitoring will provide important baseline data which will help greatly in the development of an area-wide model of geothermal resources and will enable permitting agencies to quickly identify changes that are taking place within the Long Valley Caldera. (MP)

RESPONSE: These comments, all addressing aspects of data acquisition, monitoring, and potential mitigation measures, are grouped for response because of recent related developments which should be fully explained in the Final EIR.

During recent meetings of the LVHAC, with Mammoth-Pacific as a participant, general agreement has been reached on the description of an appropriate monitoring program. A key feature of the program will be a monitoring well about 1000 feet east of the wellfield for MP II & III. (On-going monitoring conducted largely by the USGS will be continued as part of the LVHAC program.) The new monitoring well will be monitored for evidence of pressure or temperature changes. Because the well is much closer to the project well field than Hot Creek, changes would be detected there years before the changes could propagate to the areas underlying the hatchery or Hot Creek Gorge. If changes were observed in this monitoring well, the County could direct that reservoir management techniques be used to mitigate the impacts.

Such techniques could include changes in the pumping rates of production wells to change the pattern of drawdown in the reservoir, a decrease in the total pumping rate, or changes in the kind of injection support provided. If reservoir management techniques were not adequate to mitigate the impact at the monitoring well, then production could be stopped entirely as a final mitigation measure.

The appropriate mitigation actions would be required by the County, with LHVAC serving as a review body which would discuss and interpret the results of the monitoring program and the likely effectiveness of mitigation measures.

The combination of monitoring to provide an early warning system and mitigation measures designed in response to specific observations noted in the monitoring program should prevent any damage to the reservoirs underlying Hot Creek Hatchery and Hot Creek Gorge. However, because experts do not agree how fluids move within the geothermal reservoir(s) in the Long Valley caldera, it is not absolutely certain that the early warning and mitigation measures will prevent all impacts at the hatchery or at Hot Creek Gorge.

COMMENT:

Pressure decline within the hot producing zone due to power plant operation can affect flow patterns to other areas within the Long Valley Known Geothermal Resource Area (KGRA). Thus far wells MBP-3 and MBP-5 have shown some decline in productivity index, indicating pressure loss. However, direct pressure changes are still undetermined due to changes in monitoring equipment. Accurate measurements of pressure changes are necessary and should be documented prior to construction of additional power producing plants. Also, additional monitoring wells, as mentioned in Section 2.3.4 (page 42-45) should operate without the influence of further development for several years to establish baseline data, and if possible, to determine whether these wells provide an accurate assessment of pressure changes due to plant operations.

We are concerned over the cumulative effects of overall geothermal development in the Long Valley KGRA on the temperature gradient throughout the basin. Although one project by itself might seem to exert no theoretical impact, we are concerned over the impact of several such projects. It must be recognized that the recreational demand on the area will increase annually, and it will be substantial over the 30-year life of the project. (CDFG)

RESPONSE: It should be noted that the pressure declines are "apparent" and this opinion is not shared by all investigators. We believe the data for these wells indicate a decline, but that the decline is slight and even if larger declines are seen (as we believe will be the case with additional fluid withdrawal) it will not necessarily result in propagation of pressure drawdowns outside the Casa Diablo area.

We agree that as much background data as possible would be desirable once the improved pressure monitoring system is installed.

HYDROLOGY AND WATER QUALITY - SURFACE RESOURCES - CREEKS AND SPRINGS

COMMENT:

Page 3-11: A chemical analysis of Mammoth Lake tributary stream waters should be undertaken by the applicant so that baseline data can be provided. (SC)

RESPONSE: This is an idea worth presenting to Long Valley Hydrologic Advisory Committee (LVHAC). However, we believe that even weekly sampling would fail to establish a baseline, as thermal spring contribution and local precipitation varied with season as well as from year to year, even prior to MP I startup. Hence, water sample analysis for a specific period need not be directly comparable to previous or subsequent year.

COMMENT:

Page 3-11: "A portion of the flow is lost to shallow groundwater in the meadow between Highway 395 and Hot Creek Hatchery." This is not true year round. (BLM/USFS)

RESPONSE: Noted.

COMMENT:

Page 3-13: Of the three thermal springs in the Colton Spring area noted on p. 3-13, only Colton Spring itself is continuously monitored. (USGS)

RESPONSE: Noted.

COMMENT:

Page 3-15: States "Temperatures vary from 73 to 96 degrees C." Is this over time or different springs at the same time? (BLM/USFS)

RESPONSE: These temperatures were measured at different vents at approximately the same time. The tables in Technical Appendix to the DEIR show the temperatures to vary somewhat, but there is no specific trend. The variation in temperature

between sampling data is more likely due to equipment, method, creek flow and creek temperature at the time of sampling.

COMMENT:

Page 3-15: States "No changes in temperature, flowrate or chemistry have been seen in Hot Creek Gorge springs as a result of current MP I power plant operations." It is possible that changes may take up to 100 years to be observable at Hot Creek Gorge. (BLM/USFS)

RESPONSE: Acknowledged.

COMMENT:

Spring discharge at the Fish Hatchery appears to be relatively constant only during the late fall and winter. Continuous measurements in 1985 and 1986 show that the peak flows in July of each year were 32% and 75% greater than the wintertime flows at the AB spring group. (USGS)

RESPONSE: Noted.

COMMENT:

The maximum natural fluctuations of spring temperatures at the Fish Hatchery springs is ± 1.8 degrees F. (CDFG);

RESPONSE: Noted. [See data supplied by DFG biologist R. Brown included with complete comments in Section IV of this document]

COMMENT:

Supply of water, geothermal fluid, etc. to compensate or restore an "existing or present" condition (i.e., temperature?, water chemistry at Hot Creek Hatchery Springs) is not a realistic or acceptable mitigation measure. If the project proponent believes this to be "acceptable mitigation" further analysis and discussion must be presented in the final EIR and demonstration of capability to deliver acceptable "supply" water must be done. (CDFG)

RESPONSE: We agree that more investigation is necessary to prove deliverability.

COMMENT:

Page 3-31. The operation of the existing MP I plant has apparently disturbed the natural discharge rate of the Casa Diablo Geyser to such an extent the since April of 1987 this geyser spring has ceased to flow. Obviously any plant or animal life which at one time relied upon this spring source has been adversely affected. Our concern over the loss of other hot springs, artesian springs, and surface waters in the area of influence of the proposed project extends to all aquatic resources present, including endemic plants and animals. An extensive basin-wide survey on all known hot springs, artesian springs, and surface waters should include all associated habitat types and provide complete lists of all plants and animals present. This is necessary, for without even listing their names and the quantity of habitat potentially to be lost as a result of temporary or permanent disruption of flows, it will be impossible to develop measures capable of preventing their loss. (CDFG)

RESPONSE: Though we believe Casa Diablo Spring flow and MP I well production are related, the relationship is not clear and the spring flow has been reported as variable (and at times dry) before the start of MP I. Disruption of spring flow at Casa Diablo does not necessarily infer disruption of other springs and the likelihood and potential magnitude of such disruption decreases exponentially with distance from Casa Diablo.

HYDROLOGY AND WATER QUALITY - SURFACE RESOURCES - SPILLS OF GEOTHERMAL FLUIDS

COMMENT:

Page 2-21: Will the power plant site be paved as well as bermed to ensure retention of spilled fluids for proper disposal. (Sierra Club)

RESPONSE: At this time there is no plan to pave the power plant site.

COMMENT:

More discussion of past disposal (spill) of geothermal fluid into Mammoth Creek is necessary in the final EIR including sediment transport and impact on biota. (CDFG)

RESPONSE: Because of a shortage of CDFG personnel available, the information referred to could not be acquired until after the due date of these responses. However, a senior CDFG official was reached by phone, though he had limited time to discuss the issue as he was preparing for a trip out of town. He, in effect, reiterated Mr. Brown's reference to a significant temperature increase and sediment plume at the point of entry at Mammoth Creek. He also noted a survey of aquatic biota above and below the point of entry which showed a decrease in insect life downstream. He offered to look for and send any available written information the week of September 28, 1987.

COMMENT:

Page 28, Technical Appendix: The Department documented a decrease of natural biota as the result of excessive silt from Casa Diablo thermal well discharge into Mammoth Creek in 1960. The 1962 incident further exacerbated an already existing water chemistry problem.

The document fails to discuss the provision of containment facilities in areas where pipe ruptures could release several thousand gallons of hot geothermal fluids into creeks. The temperature effects of such a slug of hot fluid would be catastrophic to trout and invertebrate populations in Mammoth Creek, and perhaps, Hot Creek, a recognized blue-ribbon trout stream. Full recovery of the fish and invertebrate populations would require several months to a year and may never completely achieve the ecological balance present before the spill if more than temperature effects are involved.

The water quality characteristics of the fluids contained in the geothermal wells (Table 1-3) are such that they would significantly impact aquatic resources should a pipeline rupture or spill of these fluids occur. Specifically, the concentrations of arsenic (0.1 to 2.5 mg/L) and mercury (1.2 to 2.6 mg/L) pose the greatest threat. EPA's 1986

Quality Criteria for Water specifies concentrations for various water quality parameters. Arsenic concentrations should not exceed 0.19 mg/L and mercury should not exceed 0.00014 mg/L once every three years. Should an accident occur in the project area, concentrations of both these metals in existing waters could be exceeded in a relatively short period of time. The long-term impact to the downstream resources as well as to the use of these resources by sportsmen could be devastating. The proposed mitigation does not identify how the developer proposes to keep hot geothermal fluid from entering Mammoth Creek in the event of pipe rupture. Therefore, mitigation for this potential occurrence has not been identified. (CDFG)

The description of mitigation measures to curtail the amount of geothermal fluid that could spill is too vague. (CDFG)

Page 4-40: Once again - the proposed mitigation is much too vague. How will the proponent reduce the maximum flow of geothermal fluid that may reach Mammoth Creek in the event of a major spill of geothermal fluid (as during an earthquake. (FS and LJ)

Page 4-40, last paragraph: How is it proposed that the maximum flow of geothermal fluid to reach Mammoth Creek could be reduced? (SC)

RESPONSE: Mitigation measures for potential spills on the power plant site include berms surrounding the plant.

An additional mitigation measure has been proposed by the project proponent in order to contain spills outside the power plant sites. This involves manually and/or automatically operated valves for closing the pipes which direct drainage under State Route 203 and Old Highway 395 should a spill occur. This would prevent hot fluid from reaching Mammoth Creek. The fluid could be released or pumped into trucks after it had cooled. No doubt significant infiltration into the soil would occur in the area, but the measure should prevent catastrophic degradation of creek waters.

The design would be subject to approval of appropriate road maintenance authorities and the USFS.

COMMENT:

Reference was made at the public hearing to the spills and mitigation measures taken in the Geysers Geothermal Area of northern California, to be used as models for potential consequences and mitigation measures to be used in the case of MP II and III. (CDFG; DD)

RESPONSE: Due to schedule constraints these changes could not be reviewed nor could copies be mailed out to us for review before the due date of these responses. However, in at least one Geysers power plant site it is required that full-time automated stream water quality monitoring be installed up and downstream of potential entry points of spills. These monitors activate alarms (by phone) to various agencies and individuals and initiate periodic sampling.

We agree that the Geysers area information on spills may suggest appropriate mitigation measures. However, the recently proposed spill mitigation measure of sluice gates or valves on culverts is likely to be the best available given the favorable topography and drainage at Casa Diablo. Such measures are not feasible in the Geysers area.

Spills at the Geysers have been primarily geothermal steam condensate and chemicals being transported to the plant sites. Condensate spills accounted for 82% of the spills from 1974 to 1984. About 2% of the spills were materials used for H₂S abatement and the treatment of condensate (Warner et al., 1986). At MP II & III, the geothermal fluid would be circulated in a closed system and the working fluid would be air cooled, so there would be no condensate nor would treatment be necessary.

COMMENT:

Page 5-6: As the EIR correctly points out, the probability of contamination from spills to surface water increases with each additional power plant installed or under construction. (FS and LJ)

RESPONSE: Noted.

HYDROLOGY AND WATER QUALITY - SUBSURFACE RESOURCES

COMMENT:

Page 3-17: What is a "similar warm zone?" This appears to be building a case for inferring that the reader should choose the lateral flow model. This should be a factual and unbiased report. (BLM/USFS)

RESPONSE: All readers cannot be expected to be able to interpret the data. As with most other geothermal resources there is more than one interpretation for a given set of data. Here a comparison is being made between two prominent views.

COMMENT:

Page 4-15: Define units of kh = 500,000 md-ft and 150,000 md-ft. (BLM/USFS)

RESPONSE: The definitions are on page 4-22 in the DEIR.

COMMENT:

Page 3-7 and 4-12: The claim is made that the Upwelling/Fracture Flow Model implies that there is no hydraulic communication between the Casa Diablo area and thermal springs at the Fish Hatchery and Hot Creek Gorge. This claim would not be valid if hydraulic communication existed between these areas via deeper, hotter reservoirs and the faults which provide conduits for upflow of thermal water. I don't feel either model precludes the potential for adverse impacts on thermal springs. (USGS)

RESPONSE: The statement on page 3-7 implies that a greatly reduced risk of potential effects on springs is suggested by this model based on other geothermal reservoirs.

On page 4-12 it states "no communication" between the various areas is likely under the Upwelling/Fracture Flow model. We agree that the latter is stated too firmly given the present lack of evidence and that potential adverse effects are not entirely precluded under either model. However, we will believe that the risk of significant adverse effects are greatly reduced should the Upwelling/Fracture flow model prove to be the correct one.

COMMENT:

Page 4-17, third line, third paragraph. Mispring of "winter" for "water".(SC)

RESPONSE: Acknowledged.

COMMENT:

Page 4-21. Since a pressure rise east of Casa Diablo shown in the model, the mitigation should include actions to mitigate temperature increases as well temperature decreases. (BLM/USFS)

Page 4-13 to 4-15: Some discussion is needed in this section of the basis for assuming complete hydraulic communication between injection and production zones because the effects of injection dominate these simulations. The GeotherEx (1986) report, in fact states that it is unlikely that recharge (i.e., pressure support) is provided by reinjection because production and injection zones are separated by 500 to 700 feet of relatively impermeable thoyiite. The model results show pressure rises east of Casa D. br - what effects would that have on spring flows? (USGS)

RESPONSE: As stated several times in the main body of the EIR and in the Technical Appendix on hydrology, the model in which the calculations are based is simplistic. But as yet there is little reliable or convincing data on which to base a detailed numerical simulation including complex geologic data or pressure responses data in wells for matching. There was neither the time nor funding available for numerous trails to be run for each consultant who has ever proposed a model for the system. We still believe injection does support production zone reservoir pressure in the Casa Diablo area to some degree. However, it would be more difficult to defend choosing 0, 10, 50, 70% etc. injection support and there is no data on which to select a best case based on the results of each iteration. We believe it would be valuable for detailed numerical models to be analyzed, but that is a long-term project and must be continuously updated.

Pressure rises to the east again reveal the limitations of the model. The results simply an increase in pressure and potential for increase in spring flow. Given the distance from Casa Diablo and that the geology is far from homogeneous, we believe neither is likely.

COMMENT:

Page 4-16: Actual injection temperatures at MP I are between 160°F and 180°F.
(BLM/USFS)

RESPONSE: The temperature of 300°F applies to reheating of the injected fluid at the thermodynamic front (interface) in the injection zone. The following note should be added to explain the use of 300°F in the model:

"Actual injection temperatures at MP I are between 160°F and 180°F. The injected fluid from the power plant would be rapidly heated by the surrounding rocks to the temperature of the injection reservoir (approximately 300°F). Since the viscosity of fluid at 300°F is much lower than fluid at 175°F, performing the Bulk-Model calculation with fluid at 300°F actually results in a more conservative (i.e., rapid) estimate of the advance of the thermal front than if the 175°F temperature were used."

COMMENT:

Calculations of the rate of propagation of a cold temperature front (1,400 ft in 30 years - p. 4-16) suggest that the front could reach the vicinity of the nearest production well (650 ft) at Casa Diablo in less than ten years. Some discussion is needed of the possibility that premature breakthrough of cold water could limit the productive life of the field. The value used in these calculations for the reservoir width should be stated. (USGS)

RESPONSE: Again, we realize all of the assumptions used to construct the simple models are unlikely to reflect actual reservoir conditions. This calculation is given for comparison. It assumes a homogenous radial aquifer. In both models discussed (Lateral Flow and Upwelling/Fracture Flow) a cold water front would be prevented from moving west.

A radially unbounded reservoir was assumed in the Bulk-Model calculations. It would be useful to compare results from calculations assuming a number of reservoir widths, but this could not be done given the constraints discussed above. However, it would be interesting to see if any investigators in the region could agree on a suitable width value for use in these calculations.

COMMENT:

Please see letter report in Section IV entitled Comments Regarding the Draft EIR by Mesquite Group Inc.

RESPONSE: We thank the Mesquite Group for its expanded discussion of the Upwelling/Fracture Flow Model, which could not be described exhaustively in Appendix 1 on Hydrology. Description of the Lateral Flow Model was also subject to similar constraints.

An expanded description of the Lateral Flow Model from its supporters would also be welcomed. The Mesquite Group opinions concerning the risk to Fish Hatchery and Hot Creek Gorge springs presented by further geothermal development at Casa Diablo and information on the proposed monitoring plant are noted.

COMMENT:

Please see attached Cascadia Pacific Corporation discussion on the hydrology section of the MP II & III EA/EIR opinions concerning probable risk to thermal springs.

RESPONSE: Noted.

COMMENT:

Please see attached GeothermEx letter report on the hydrology section of the MP II & III EIR/EA.

RESPONSE: Noted.

NOISE

COMMENT:

Page 3-21, paragraph 3. Silencers have been re-installed on the expander exhausts of the operating plant, resulting in a greatly reduced overall noise level from the plant. The current noise level recorded at 0.5 mile distance is approximately 40 dBA. The noise level adjacent to the plant along Hot Springs Road (old Highway 395) has been reduced from an average of approximately 80 dBA without the silencers to 69 dBA with silencers and other noise reduction equipment installed on both units. (MP)

RESPONSE: Acknowledged.

COMMENT:

Page 3-21. Reduced noise levels at MP II, III should be a design priority. Duplication of noise complaints associated with plant MP I is unacceptable. (FS and LJ)

RESPONSE: Noted.

COMMENT:

From information in the draft EIR/EA it is unclear what project-related noise levels will occur off-site, or if such levels will conflict with proposed land uses around the proposed facility. An analysis of noise levels at the property lines of the proposed facility should be provided, and noise levels that are acceptable for the proposed use of the surrounding lands should be identified and discussed. (CEC)

RESPONSE: Section 4.1.3 discusses anticipated noise levels at all off-site noise-sensitive receptors in the vicinity of the project area. In all cases, outdoor noise levels at these receptors were found to be less than 50 dBA, L_{eq} , which would not present noticeable noise impacts. Section 5.3.1.3, p. 5 to 9, indicated that "no noise sensitive development is currently planned for areas within 0.5 mile of the project site," and that noise levels beyond that distance would not be intrusive.

COMMENT:

Page 4-23. A night-time concern or impact is not identified, why mitigate. (BLM/USFS)

RESPONSE: Acknowledged.

AIR QUALITY

COMMENT:

Page 3-30. GBUPACD has no permit program for wood-burning devices. (GBUPACD)

RESPONSE: Acknowledged.

COMMENT:

Page 4-25. (Re: Worst-case 24-hr. PM₁₀ levels): How is this arrived? Needs support. (BLM/USFS)

RESPONSE: The PM₁₀ particulate portion is generated at varying rates depending on weather conditions and other factors, but a useful worst-case value is 1.2 tons per acre per month of activity (BAAQMD, 1985). This figure includes emissions from excavation and earthmoving, traffic on unpaved surfaces, wind erosion, and construction.

COMMENT:

Page 4-25. Although the air quality within the boundaries of the John Muir Wilderness area may not be affected, air pollution emissions may be viewed by visitors within the wilderness area. (LJ)

RESPONSE: Acknowledged.

COMMENT:

Page 4-26. Add the following mitigation to those indicated: Surface permanent roads and pads with at least four inches of road base material. (BLM/USFS)

RESPONSE: Acknowledged.

COMMENT:

Page 4-26. Fourth mitigation. Build a wall? Not practical or effective. (BLM/USFS)

RESPONSE: Noted.

COMMENT:

Page 4-26. Fifth mitigation. A 15 mph speed limit is unacceptable. (BLM/USFS)

RESPONSE: Noted.

COMMENT:

Page 4-26. What will be the source of fresh-water needed to reduce construction dust. Perhaps reclaimed water from MCWD could be utilized. (LJ)

RESPONSE: The source of water to reduce construction dust has not been determined. Reclaimed MCWD water should be considered.

COMMENT:

Page 4-27. Mitigation. Drilling has not been identified as causing an impact and long-term testing would not reach the atmosphere. Change first sentence of mitigation to read: "Limit cleanout and short-term testing activities to one well at a time." (BLM/USFS)

RESPONSE: Acknowledged.

COMMENT:

Page 4-27, paragraph 2. The assessment of hydrogen sulfide emissions during well testing operations assumes the well will be pumped during the short-term (two to four hour) well cleanout period. This assumption is incorrect and the 2,000 gpm pumped well flow rate overestimates the expected hydrogen sulfide emissions. The proposed operations would allow the wells to flow naturally without pumping (flow rate estimated not to exceed 500 gpm) to on-site tanks. This rate of flow would not result in emissions in excess of those allowable under GBUAPCD emission standards (2.5 kg. per hour per well), as conservatively calculated below:

$$500 \text{ gpm} \times 3.785 \text{ l/gal} \times 8 \text{ mg/l} \times \text{kg}/10^6 \text{ mg} \times 60 \text{ min/hr} = 0.9 \text{ kg/hr}$$

The 2,000 gpm flow rate refers to the estimated pumped flow rate of the wells during long-term flow testing. The long-term flow tests would be conducted in a closed system and would, therefore, not release any hydrogen sulfide to the atmosphere. (MP)

Page 4-27. GBUAPCD will require mitigations on flow tests of wells so that H₂S emissions will not exceed emissions limits and ambient standards. The long-term test flows should be run through the existing MP-1 plant and reinjected as will be done for the PLES-1 flow tests. (GBUAPCD)

RESPONSE: Acknowledged.

COMMENT:

Page 4-28 (re: amount of isobutane emitted) The PLES EA shows possibly to be less than the hydrocarbons emitted from the forested area to the east. How does this compare to a typical Mammoth gas station? (BLM/USFS)

RESPONSE: A California Air Resources Board (1987) inventory of isobutane emissions in Mono County for the year 1985 indicates that gasoline dispensing accounts for about 53 lbs per day of emissions. Total isobutane emissions for the county were estimated at about 91 lbs per day. Estimates of early 1987 losses from the MPI plant represent 175% to 1000% increases over estimated 1985 levels. Operating emissions of MP I, II, and III would be no more than 750 lbs per day. Isobutane is considered a slightly photo-reactive hydrocarbon. In contrast, hydrocarbon contained in by-products of gasoline combustion and that produced by some varieties of trees is considered reactive.

COMMENT:

Page 4-29. No more than 250 lbs/per day of isobutane should be allowed to escape into the atmosphere. (LJ)

RESPONSE: See page 4-29. The GBUAPCD will not allow emissions to exceed 250 pounds per day.

COMMENT:

Pages 4-30 to 4-32. The draft EIR/EA states that substantial emissions of both H₂S and isobutane could result during upsets of the facility. Ambient concentrations that would result from such events should be compared to levels that are considered acceptable for public exposure. Criteria used to gauge such exposures should consider the effects on sensitive members of the general public. (CEC)

RESPONSE: Federal Occupational Safety and Health Administration guidelines have set the maximum acceptable H₂S concentration at 50 ppm for no longer than ten minutes during any eight-hour period. The acceptable ceiling concentration of 20 ppm should be considered the upper limit for acceptable exposure to sensitive members of the public. The concentration shown in Table 4-9 for severe upsets may exceed these levels. OSHA guidelines for isobutane have not been set, although as stated on page 3-28 isobutane is flammable at concentrations between 1.8% and 8.4% in air. Model results for catastrophic release of isobutane, as shown in Table 4-11, indicate that this hazardous level could be reached.

COMMENT:

The geothermal fluid released during upsets can contain trace amounts of arsenic, lead, and mercury. The resultant public exposure to these pollutants should also be evaluated. (CEC)

RESPONSE: The use permit application for MP II & III (Mono County application No. OIE-86-02) indicates that lead is not likely to be present in any of the planned production wells at the site. Arsenic has been measured in fluids from nearby wells, but would form compounds which would precipitate from the hot geothermal fluids and would not become air quality hazards. A small fraction of mercury was detected in one of the eight wells tested. Prolonged inhalation of the geothermal fluids from this well could expose an individual to toxic levels of mercury. Under normal operating conditions such exposure would not occur.

COMMENT:

Page 4-31, paragraph 4. States isobutane is normally stored as a colorless, odorless, ... gas. However, for the MP II & III project, it is proposed that an odorant would be added to the hydrocarbon working fluid, prior to storage and use. (MP)

RESPONSE: Acknowledged.

COMMENT:

Page 4-33, paragraph 1. States vacuum truck would collect hydrocarbon vapor for potential reuse. Should state vacuum trucks would be used to collect non-vaporized hydrocarbon liquid for potential reuse or disposal. (MP)

RESPONSE: Acknowledged.

COMMENT:

Page 4-34, paragraph 1. States relief valves and discharge valves would be opened to reduce the quantity of material available for combustion. Should state these valves would be closed to reduce ... (MP)

RESPONSE: Acknowledged.

COMMENT:

Page 4-34, paragraph 2. States a mercaptan should be added to the isobutane as an odorizer. However, it has been demonstrated that mercaptans are not stable at the temperatures expected in the geothermal heat exchanger. As such, should state a temperature-stable odorizer, such as tetrahydrothiophene should be maintained in the system. (MP)

RESPONSE: Acknowledged.

COMMENT:

Page 5-9. The cumulative amount of construction time for constructing all proposed geothermal plants of four years is considerable. The impact on regional air quality when viewed in this light is considerable. Perhaps tighter constraints on air quality during the construction phases is necessary. (FS and LJ)

RESPONSE: A four-year construction period is the worst-case estimate based on a sequential timing of construction periods. In reality, it is anticipated that PLES I and MP II would be built, to the extent possible, simultaneously, thus reducing the net air quality impact.

COMMENT:

The document states, on page 5-10, that the facility may emit 1,500 to 6,000 lbs/day of non-methane hydrocarbons. This may also be considered to be a significant impact. It is

unclear that this impact will be mitigated to the extent feasible. (CEC)

RESPONSE: The cumulative case considers six separate geothermal plants, not one facility. With mitigation measures required by GBUAPCD, total emissions of working fluids for six plants would not exceed 1,500 lbs/day. This is not considered a significant impact.

COMMENT:

Pages 5-9 to 5-10. The document, states that construction activities could cause new or continued violations of the state's ambient PM₁₀ standard. This is unlikely to be considered a significant impact, yet there is no indication that impacts will be mitigated to the extent feasible.

RESPONSE: If Mono County is reclassified as "non-attainment" for PM₁₀ as anticipated by the GBUAPCD, then a PM₁₀ attainment plan would impose specific measures for reduction of PM₁₀. Until then, the mitigation measures proposed on page 4-26 would control fugitive emissions of particulate matter from construction activities at the site.

COMMENT:

Page 5-10, paragraph 3. The analysis for cumulative impacts from fugitive emissions of hydrocarbons (see Table 4-7) is overstated in that two of the six proposed power plants (Mammoth/Chance Units I and II) would be located at least two miles east of the Casa Diablo area and would not perceptibly influence the maximum ground-level concentration of hydrocarbon resulting from fugitive emissions in the Casa Diablo area. As such, they should not be considered in the single source, PTPLU model, analysis. (MP)

RESPONSE: The purpose of the cumulative analysis was to identify maximum concentrations of isobutane caused by continual leakage from joints and fittings under worst-case meteorological conditions. To that end, emissions from the six plants were modeled as a single point source. The ground-level concentrations shown in Table 4-7 for emissions rates of 1,500 and 6,000 lbs/day are less than 0.2% in air and do not present a safety risk. If the results of that modeling effort had indicated that ignitable concentrations could be reached, then it would have been necessary to separate out the sources for a more realistic representation.

BIOLOGICAL ENVIRONMENT

VEGETATION

COMMENT:

The draft EIR/EA fails to provide adequate information on the existing biotic conditions or possible impacts on rare or endangered species or natural communities. The draft EIR/EA cites a "biotic assessment" by Dean Taylor and Richard Buckberg (1987) as the basis for the discussion on vegetation. However, this study was conducted at an inappropriate time of year (winter), without an appropriate level of study for impact analysis (D. Taylor, personal communication, 8/27/87). According to Dr. Taylor, these limitations are stated in his report, which was intended to be only a general scoping study. Although other supporting data were attached as appendices, the "biotic assessment" was not attached.

A detailed rare plant survey report which follows guidelines provided by the California Department of Fish and Game should be prepared to serve as a data base for assessing potential impacts to rare plants. (CEC)

RESPONSE: The following is quoted from Taylor and Buckberg (1987):

"Based on the array of species and habitats of rare plants known for the eastern region (Table 2), we can offer two lines of evidence why we feel occurrence of specific species on the Casa Diablo Hot Springs study site would not be expected given current information."

"History of Botanical Collecting - the site, located adjacent to highway, has often been visited by botanists passing through the eastern Sierra region. The first collecting of which we are aware (through personal communications and herbarium research) was in the 1930's, when John Thomas Howell and Alice Eastwood, and Frank Peirson collected along Highway 395 and in the Mammoth Area. Eastwood and Howell visited Casa Diablo Hot Springs, but found no rare species there. The Eastwood and Howell collecting trips were effective explorations, as several previously unknown species were discovered (including *Lupinus duranii*, *Astragalus monoensis*, and *A. joahnnis-howellii*). Peirson's collecting in the Long Valley region was also thorough, for example, he discovered *Pedicularis crenulata* var. *candida* growing at Convict Creek."

"Other botanists, including Dean Taylor and Mary Dedecker, have also collected at the site in the past, without noting rare plants."

"Array of Habitats and Geography - the availability of habitats for rare plants on the site are seemingly such that potential habitat for several candidate species ... is absent. The Mono milkvetch (*Astragalus monoensis*) is known to occur about one mile to the north of the Casa Diablo area, but we did not observe this species on the study. At the time of our survey, *A. Monoensis* plants, although dormant, were evident and easily recognized (as observed at nearby populations) if flowering, but we would have detected any populations on the site. The habitat for this plant, the pumice soils with moderate to low sagebrush cover, occurs on the northern portion of the site, but *A. monoensis* is apparently absent there."

"Others of the species (which could occur in the area) are typical of hot springs or alkaline meadow areas in the Eastern Sierra. Occurrence of these species on the Casa Diablo Hot Springs site was not documented in this survey, nor have there been historical reports of these taxa from the site."

"Two species occurring in the Mammoth region for which detailed habitat information is lacking, Mammoth Lupine (*Lupinus sublanatus*), last seen in 1935 and known only from the type collection, and Pine City stonecrop (*Sedum pinetorum*), last seen in 1913 and also known only from the type collection, are unlikely to occur on the site. The Mammoth Lupine is known from a single collection near the "Earthquake fault" along Highway 203, while the sedum was collected in the montane forests west of Old Mammoth (the sedum was once thought to occur only in Mexico, but this supposition is erroneous)."

COMMENT:

Page 4-34, last paragraph. What is the name of rhyolite buckwheat? Is it state listed? Who determines if a plant is botanically sensitive? (BLM/USFS)

RESPONSE: Rhyolite buckwheat, Eriogonum kennedyi var. purpursii, is not listed by the state or federal agencies. The rhyolite buckwheat scrub community includes many herbs, the most important being pussy-paws (Calyptridium Umbellatum), locoweed (Astragalus purshii), and cheatgrass. This plant community is restricted to present or formerly thermally affected soils and is essentially limited to such areas in the eastern Sierra region (Taylor and Buckberg, 1987). It can be considered a botanically sensitive area using California Department of Fish and Game, Data Base Criteria (see Holland, 1986).

COMMENT:

Information should also be provided regarding disturbance to areas identified as "thermal marsh" and mountain meadow communities, as these may be wetlands and thus subject to state and federal policy.

All wetland areas should be completely avoided. Wetlands areas that have been degraded without federal permits should be rehabilitated. (CEC)

RESPONSE: No impacts to these communities are expected.

COMMENT:

Page 4-35, paragraph 2. We have worked closely with a Subcommittee of the Owens Valley Interagency Council ("OVIAC") and representatives of Mono County on landscaping of the operating plant. We have always agreed with and continue to completely agree with, the need for landscaping, but believe that the following points should be acknowledged:

A) The soil in the area is infertile with low moisture holding capacity which inhibits rapid plant growth in the relatively short growing season available.

B) There are natural open areas where vegetation currently does not grow. These areas are especially hard to revegetate.

C) The project area is geothermal in character and there are considerable portions of the area where the surface or sub-surface ground temperature is high enough to kill vegetation. It will not likely be possible to establish vegetation to grow in these already denuded areas.

D) Fencing can be used in some, but not all, locations for effective screening of pipelines because of terrain. There are certain number of plants and trees that will necessarily have to be removed by reason of selection of the proposed alternate plant site. We propose, wherever feasible, to transplant existing trees to other locations including the existing plant site so as to improve the overall landscape. However, it should be noted that Jeffrey pines are difficult to transplant successfully, and it may be more practical to plant seedlings. (MP)

RESPONSE: Comments noted. Growing conditions would limit good plant growth.

COMMENT:

Page 4-36. Seedling survival should be monitored and if less than 75% of seedlings have survived, then replacement planting should be conducted. Three years is much too long. (FS and LJ)

RESPONSE: A 75% survival rate seems high and optimistic for the region and the species to be used for revegetation. A more realistic percentage should be about the 50% survival level -- this is a typical percent for revegetation work in the western United States, especially in nutrient poor soils of the Great Basin.

It is agreed that a three year long monitoring period to determine seedling survival is long. Two growing seasons, should be used to determine seedling production and survival.

COMMENT:

Page 4-37, paragraph 1. States the pipeline from wells MP 12-32 and MP 12A-32 should be moved approximately 50 feet north to avoid the botanically sensitive area to the west of the proposed power plant site. However, the pipeline route proposed would actually follow the operating plant pipeline along an existing access road and would not impact the botanically sensitive area identified in the Draft EIR/EA. Further, moving the pipeline 50 feet north would increase the visibility of the pipeline along the Bluff north of the existing MP Unit 1 power-plant. (MP)

RESPONSE: According to the vegetation map provided by Taylor and Buckberg (1987), the pipeline would pass through an area of rhyolite buckwheat scrub (see Figures 2-2 and 3-5 in the DEIR). However, the scale of mapping makes it unlikely that areas are precisely delineated. The general mitigation (p. 4-37) that a botanist should groundtruth the locations of wells and pipeline, to ensure that they would not impinge on botanically sensitive areas applies, regardless of how the details of vegetation are shown on the maps.

COMMENT:

Page 4-34. It seems to be implied in the last paragraph that the previous disturbance of three acres of the power plant site somehow softens the impact of further vegetation loss. Furthermore, the case is editorially put in a minimizing fashion. Could it not also be put that "more than 12 acres of Jeffrey pine, more than six acres of sagebrush scrub ... would be directly affected?" This instance is characteristic of the recurrent pro-project tone of the entire document. (SC)

RESPONSE: The acreage of the disturbed area is included for completeness. The phrase "up to 13 acres ..." is used to provide an upper limit; "... more than 12 acres" is meaningless, since it could be 13 acres or any larger number. The logical question which follows would be "how much more than 12 acres?"

COMMENT:

Page 3-34. Complete botanical (and faunal) knowledge should have been obtained for the leasehold and included within this DEIR. (SC)

RESPONSE: A biotic survey of the site was conducted in 1986 by Taylor and Buckberg. That document is available at the BLM office in Bishop and at the Mono County Energy Management Department in Mammoth Lakes.

TERRESTRIAL WILDLIFE

COMMENT:

The draft EIR/EA should identify wildlife species that occur on or near the project site. Specific information on the occurrence of Sage Grouse on the project site (as opposed to a general discussion about the regional occurrence) should be provided. (CEC)

RESPONSE: See Section 4.1.2.2, page 4-37. Discussions with USFS grouse experts indicated that the project site receives little sage grouse use.

COMMENT:

Page 3-37: A more accurate picture of deer migration over the Sierra Crest would include mention of Deadman Pass and San Joaquin Ridge as key migration routes.

Additional discussion of the importance of spring migration habitat to herd viability is required. The fact that does are carrying fawns in the spring and therefore are particularly vulnerable to stresses and disturbances, such as new developments on or near migration pathways, should be stressed in the discussion. (CDFG)

RESPONSE: Deer probably migrate over both Deadman Pass and San Joaquin Ridge. Neither area would be directly impacted by the project. Acknowledged. Does carrying fawns may be more vulnerable to stress during migration than other deer.

COMMENT:

Page 4-38. I have personally observed over 250 mile deer during spring migration/staging in the riparian area along Mammoth Creek just below the bridge over 395. The mule-deer study makes no reference to the impacts on these animals due to noise during construction and operation. Its focus is too site specific when it only considers the dozens of deer that may pass directly thru the project site. (FS and LJ)

RESPONSE: The riparian area below the 395 bridge is over 0.5 mile from the project site. Construction noise is not expected to significantly affect deer migration. Deer currently migrate past the existing MP I during operation.

COMMENT:

Page 4-38, second paragraph, third and fourth lines. The use of "directly" connotes prevention, not slowing. What are the areas impassible by deer? (BLM/USFS)

RESPONSE: By blocking passage of the deer, the power plants and associated pipelines could directly prevent deer from crossing the project site. Impassible areas may be created by the plants and other facilities.

COMMENT:

Page 4-38, fourth paragraph. Is there any data (sic) to indicate this is an effective mitigation? Where did the numbers come from? (BLM/USFS)

RESPONSE: Distance between crossings and crossing width were developed during mitigation work done for PG&E's Crane Valley hydroelectric facilities in Madera County, California. Mitigations were developed in cooperation with PG&E and CDFG personnel.

COMMENT:

Page 4-38, paragraph 4. The Draft EIR/EA suggests the applicant adopt costly mitigation measures for impacts on deer migration which are characterized in Appendix C to the document to be "trivial" even under a "worst case" scenario. Therefore, the mitigation measures appear unjustifiable. (MP)

RESPONSE: The mitigation measures are designed to offset both direct on-site impacts and regional cumulative impacts. CDFG, the responsible agency, considers potential impacts to deer an important issue.

COMMENT:

Page 4-38, paragraph 5. The Draft EIR/EA suggest the applicant consider acquisition of mule deer winter range habitat as a mitigation measure. This appears unjustifiable because: (1) the project does not specifically impact mule deer winter range habitat; and (2) the project is not expected to significantly impact mule deer. (MP)

RESPONSE: Acquisition and protection of threatened winter range deer habitat would help maintain the viability of local deer herds by protecting key elements needed for their life history. Swall Meadow is used for migration in addition to wintering.

Alternatively, for in-kind mitigation, private lands in Little Round Valley south of Lake Crowley could be purchased and protected. Consultation with CDFG and USFS would be required to determine key parcels used by deer during migration.

COMMENT:

Page 4-38, last paragraph. There is no federal land for sale on this area. The purchase of federal land would not create additional habitat. Probably not legal to require a private land owner to buy land in order to develop his own land. Please omit mitigation. (BLM/USFS)

RESPONSE: The wording of the mitigation should read: "If necessary, consider the appropriation of funds toward the purchase for transfer to federal ownership of land in the Swall Meadow area for winter range habitat, which is presently privately owned."

The goal would be to protect existing habitat which is in danger of development. The mechanism for implementation would likely require all project sponsors to make contributions to a mitigation fund which could be used to finance appropriate mitigations. This would be an appropriate mitigation to maintain the viability of the deer herds wintering at Swall Meadow and migrating through the Mammoth Lakes area.

COMMENT:

Page 4-38. Though some negative impact from pipelines and fencing is unavoidable, we concur with the stated mitigation to design these obstacles so as to minimize the impact. Even so, some migratory deer impacts will still occur through unavoidable increase in noise, visual obstructions, and physical barriers. A detailed map of pipeline routes should be included to enable specific evaluation of these problems and this measure's ability to mitigate them. Burial of 100-foot segments of pipeline also recommended to better provide for deer passage.

RESPONSE: A detailed map of pipelines, fences, and facilities would be developed in the siting and engineering phase of development. These plans would include mitigation measures required by the County.

COMMENT:

Appendix C Page C-14. We concur with the methods and findings of the deer migration study. However, the interpretation that deer show preference for the less developed portions of the area is substantiated by prior collection of information by the Department of deer migration. Considering historic deer migration use, a more accurate interpretation would be that deer actively avoid the existing MP I power plant due to noise and visual impacts and the presence of substantial physical barriers in the form of fences and pipelines. This avoidance response effectively results in project impacts to deer use area beyond that physically occupied by project features.

Appendix C. Page 7, C-19. The apparent avoidance of existing development by deer demonstrates the importance of fully considering cumulative impacts of additional projects such as MP II and MP III. As projects multiply, habitat options for various wildlife species decrease, unavoidably causing stress and direct losses to wildlife populations. To quantify such losses, we recommend that all geothermal development project approvals in the area be kept in abeyance until an areawide study of cumulative impacts to all natural resources, including deer, can be completed by the permitting authority. Such a study would allow decision makers to recognize those projects which provide for retention of aesthetically and economically important natural resources and those that do not. (CDFG)

RESPONSE: We acknowledge and concur with CDFG's interpretation of the deer migration study. We agree that cumulative impacts from geothermal and other developments in the Mammoth Lakes areas could be significant, and that a thorough study of potential cumulative affects is needed; however, it is beyond the scope of this project.



COMMENT:

Page 4-67. Due to its greater unavoidable impacts, we oppose the alternative location proposal. (CDFG)

RESPONSE: Noted.

COMMENT:

Page A-3 (Appendix): We concur with the environmental checklist, item 5-C, that the project will result in a barrier to animal movements. This impact is not mitigable to a level of non-significance. (CDGF)

RESPONSE: Noted. Based on the deer migration study, we believe the mitigations could reduce potential impacts on animal movements from this project to a non-significant level.

AQUATIC RESOURCES

COMMENT:

Appendix A-3, (Initial Study), #5 Animal Life. This project has the potential to change the diversity and/or number of species of animals present throughout the Long Valley KGRA, not only within the project area as stated in the document. However, it has not yet been determined if there exist within this potentially affected area any unique, rare, or endangered invertebrate species. Therefore, it is necessary to survey all hot springs, artesian springs, and surface waters in the Long Valley KGRA in order to inventory all aquatic oriented animals including fish, reptiles, amphibians, and invertebrates. (CDFG)

RESPONSE: The suggested study is beyond the scope of this document.

COMMENT:

Page 3-40, paragraph 2. A report titled Biological Assessment of Proposed Geothermal Energy Development in Casa Diablo Hot Springs Area on the Owens Tui Club (Gila bicolor snyderi) and Hot Creek Headsprings Refugia, August 1987, has been submitted for review by the U.S. Fish and Wildlife Service in conformance with Section 7 of the Endangered Species Act. The submitted report can be fairly and succinctly summarized by stating that the proposed development will have no significant impact on the Tui Chub. (MP)

RESPONSE: Acknowledged.

COMMENT:

Page 3-40 and 3-41. Delete all references to "hot" springs at the Hatchery. (BLM/USFS)

RESPONSE: Comment acknowledged. The springs at the Hot Creek Hatchery may not be considered hot but are warm relative to above-ground surface waters in the area.

COMMENT:

Page 4-39. Replace mitigation listed in paragraph four with the mitigation in paragraph two referencing Section 4.1.1.1. in the DEIR.

RESPONSE: Comment noted. The erosion and sedimentation control procedures, however, do not adequately answer to the problem of hazardous material spills; therefore, the presently stated mitigation measures should remain in place.

COMMENT:

Page 4-40. Require applicant to restock trout in the sections affected by a spill. (BLM/USFS)

Page 4-40. The detrimental effect (of a spill reaching Mammoth Lake) on the catch and release section due to trout mortality from high water temperatures would be severe. In that event, a census of number and size of destroyed trout should be taken, and the same size and species of fish replaced by the proponent responsible. A similar mitigation should apply to impacts that may occur at the hatchery.

Page 4-61. A significant mortality of trout in Hot Creek is not a temporary effect. (FS & LJ)

RESPONSE: The following mitigation should be added on page 4-40:

- Require the project sponsor to restock trout in the sections affected by a spill.

COMMENT:

Page 4-42. Could pipe water from injection lines to hatchery and not increase withdrawal of fluids. (BLM/USFS)

RESPONSE: Noted. This would reduce the level of injection support to the injection reservoir. Supplying geothermal water to the hatchery would require use of geothermal fluid, whether it resulted from increased production or decreased injection.

COMMENT:

Cumulative biological impacts of geothermal development in the Long Valley Geothermal Resource Area are not adequately addressed. A study of the cumulative biological impacts of this and other developments in this area should be completed prior to the approval of any additional power plants, and should be included in the data used to determine the cumulative impacts related to the proposed project. (CEC)

RESPONSE: Cumulative impacts relating to proposed projects near Mammoth Lakes are discussed in the DEIR (see pages 5-11 and 5-12). Cumulative biological impacts of geothermal development in the entire Long Valley Geothermal Resource Area is beyond the scope of this document.

COMMENT:

Cite experience at the Geysers to discuss changes in aquatic fauna (CDFG).

RESPONSE: Siltation of salmonid spawning gravels and decreased food production in the form of benthic invertebrates are of particular concern at the Geysers. The steep slopes characteristic of the area are susceptible to erosion and landsliding and spills travel rapidly on the steep slopes. This impact is less severe at Casa Diablo because the topography is gently sloping and there are fewer perennial streams to be affected. In particular, the spill control measures suggested by the project sponsor for MP II & III should be sufficient to stop fluids from reaching Mammoth Creek.

Spills at the Geysers have been primarily geothermal steam condensate and chemicals being transported to the plant sites. Condensate spills accounted for 82% of the spills from 1974 to 1984. About 2% of the spills were materials used for H₂S abatement and in the treatment of condensate (Warner et al., 1986). At MP II & III, the geothermal fluid would be circulated in a closed system and the working fluid would be air cooled, so there would be no condensate nor would treatment of it be necessary.

Easeline studies of aquatic fauna at the Geysers are available; but, in the time available since receiving the comment, we have not been able to obtain studies which document the effects of spills on aquatic fauna.

SOCIAL ENVIRONMENT

VISUAL RESOURCES

COMMENT:

Page 3-46. MP II, III will contribute to the continued degradation of the Highway 15 scenic corridor. (FS & LU)

RESPONSE: Noted.

COMMENT:

Page 3-42, paragraph 2. Replace paraphrase of GRO Order 4 with a direct quote. GRO Order 4 states that "The lessee shall reduce visual impact, where feasible, by the careful selection of sites for operations and facilities on leased lands. The design and construction of facilities shall be conducted in a manner such that the facilities will blend into the natural environmental setting of the area by the appropriate use of landscaping, vegetation, compatible color schemes, and minimum profiles. Native plants or other compatible vegetation shall be used, where possible, for landscaping and revegetation." (BLM/USFS)

RESPONSE: Noted.

COMMENT:

Page 3-42, paragraph 3. Delete the existing paragraph under Forest Service Plans and Policies. Add the following to the preceding BLM discussion. "The BLM's Lease Block I

Environmental Analysis and subsequent geothermal lease stipulations designate the proposed project site, and most adjacent areas along Highway 395, as Visual Resource Constraint Level 2. This constraint level requires that surface occupancy for high impact geothermal activities should be "...excluded unless surface management concerns can be mitigated." (BLM/USFS)

RESPONSE: Acknowledged. Make the appropriate changes to the text of the DEIR.

COMMENT:

Page 4-43. Change mitigations to read: "Paint long-term equipment to blend with the surroundings." (BLM/USFS)

RESPONSE: Agreed.

COMMENT:

Page 2-28. New electrical transmission lines should be buried adjacent to road easements. (FS & LJ)

Page 4-43. All new power transmission lines should be underground to reduce visual impacts with revegetation of disturbed soil. (FS & LJ)

RESPONSE: Noted. Burial of power transmission lines would reduce their visual impacts. The lines could also be carried in conduits along pipelines, which also would remove them from the overhead visual environment without additional disturbance of soil and subsequent need for revegetation which burial would require. An additional mitigation should read: "Electrical transmission lines should be buried or should be conveyed in conduits along pipelines."

COMMENT:

Put all fluid transmission lines below grade. (PC)

All pipelines should be below grade. (PC)

Fluid conveyance lines should be concealed behind berms along adjacent road easements. (FS & LJ)

RESPONSE: Berms or trenches could be used to screen pipelines from view, but this was not suggested as a mitigation for the following reasons:

- Excavation to build the berms and or trenches would disturb the soil and change the topography over an area approximately 20 to 30 feet wide along the pipeline. If all project pipelines (including those traveling along existing pipelines) were bermed, this would result in a disturbance of up to five acres. The slope of the disturbed area would be relatively steep, causing an increase in erosion rates. The slopes could be revegetated, but it is possible that to maintain the berm height, maintenance grading would be required. In that case, the soil would be disturbed in the long term.

- Natural drainage patterns would be disrupted and water channeled along pipeline routes.
- The pipelines would be less accessible for maintenance and inspection.
- If pipelines were near berm walls, the pipelines could be damaged by contact with the berms during an earthquake.
- Shallow bedrock in parts of the project area could substantially increase the difficulty of berm construction.

COMMENT:

Page 4-44, first mitigation. Add "pipelines" to list. Also add sentence: "Utilize existing vegetation to screen intrusions from critical viewshed points." (BLM/USFS)

COMMENT:

Page 4-43, first paragraph. Grading for pads and access roads can alter the landscape form more than "slightly," depending on slope and layout. (SC)

RESPONSE: The site is one of relatively low relief and should not require significant topographic changes.

COMMENT:

Page 4-44, sixth bullet. Not beneficial visually or practically as snow tends to destroy fences. (BLM/USFS)

RESPONSE: Noted.

COMMENT:

Page 4-44, last bullet. Exterior light should be directed inward and downward toward work areas, should be shielded so that no light shines outward nor upward, and should be equipped with operational switches so that light may be turned off when not needed. (SC)

RESPONSE: Noted.

COMMENT:

Page 4-46, fourth line. What other mitigations? (BLM/USFS)

RESPONSE: The sentence should read: "These mitigations..."

COMMENT:

Page 4-46. The draft EIR/EA states that even with mitigations the plant would be noticed by casual observers and the project would therefore be inconsistent with the Visual Management Objective of "retention." However, the text does not state whether this inconsistency would constitute a significant environmental impact. The document should make a determination on this issue.

Page 5-14. The document described the cumulative visual effect of the project in combination with the existing Mammoth Pacific I project and the proposed PLES I project. However, it does not assess whether this impact would constitute a significant environmental impact, either before or after mitigation. (CEC)

RESPONSE: See page 5-1. The impact would be significant, even after mitigation.

COMMENT:

Page 3-46. In general, MP I is a very poor example of the proponents' sensitivity to the high visual quality associated with the Eastern Sierra region. I feel it is audacious on their part to include "the existing geothermal development" as part of their justification of the other visual pollution in the area.

In light of Mammoth Pacific's track record in this area, a full and detailed visual impact analysis, including revegetation and the use of berming, etc. should be submitted prior to the issuance of the CUP. (FS & LJ)

RESPONSE: Noted.

COMMENT:

Page 2-22. The alternative plant location seems to be less visually sensitive as it can be partially screened by existing Jeffery pines. This would be a preferred location. (FS & LJ)

Page 4-44. The alternate site for MP II, III should be used to reduce its visibility. (FS & LJ)

Page 4-46, paragraph 2. Based on further review, we agree with the recommendation of others to relocate the proposed plants about 400 feet east relative to power plant #1 of the initially proposed site in order to take advantage of the screening effect which would be provided by existing mature trees. We have also decided to reduce the visual impact of the existing plant by putting redwood slats in all of the chain link fence around the plant as well as all existing and proposed well sites that would be visible from public roads in the area. (MP)

RESPONSE: Noted.

COMMENT:

Page 5-1. As the MP II, III geothermal power plants are in direct conflict with the USFS VMO of "retention," I urge that the no-project alternative be adopted.

RESPONSE: Noted.

COMMENT:

Pages 5-12 and 5-14. Is the appearance of an "industrial park" type of viewscape appropriate for Eastern Sierra visitors just as they are exiting 395? Since recreation is certainly the emphasis of our regional economy, and further geothermal development and the continued industrialization of the Long Valley area is in direct contract with these economic and aesthetic values, we strongly recommend a no-project alternative for Mammoth Pacific II and III. (FS & LJ)

Pages 5-14 to 5-15. The document should assess whether the cumulative land use effect of "transforming several undeveloped areas to industrial uses" would be a significant environmental impact, even though it would be consistent with Mono County and Inyo Forest Plans except for the Visual Management Objectives for the area. (CEC)

The document should discuss the effect of industrialization of Long Valley. (DD)

RESPONSE: Recommendation noted. The degradation of visual quality at Casa Diablo due to the construction of the project is not likely to have any adverse impact on the regional economy (see discussion under Economics on page 52 of this document). The industrialization would not be any more or less significant in terms of visual impact than other forms of development in the Long Valley area. Agricultural development or urbanization or resort development, for example, would not be preferable to industrialization from the perspective of retaining a high quality, natural visual environment characteristic of the Eastern Sierra. Therefore, the issue confronting decision-makers is how to balance changes in the visual environment in the Long Valley area, whether they are caused by cooling towers, control towers, multi-story buildings, or large areas of unnatural vegetation, against economic effects of proposed projects.

The impact is significant because it is inconsistent with the VMO of the area. It is not important that the structure be considered "industrial".

SOCIOECONOMICS - LAND USE

COMMENT:

Page 3-48, Figure 3-8. Delete USFS designated range from map because grazing allotments cover almost all the map. Change USFS Lease Block 1 to BLM Lease Block 1. (BLM/USFS)

RESPONSE: Noted.

COMMENT:

Page 3-49. Add gasoline storage tanks owned by Chevron to list of land uses. (BLM/USFS)

RESPONSE: Noted.

COMMENT:

Page 4-46. The draft EIR/EA states that the project is compatible with current County and United States Forest Service plans, with the exception of the applicable visual resource management policies. However, the text does not discuss whether the project would conflict with existing and planned land uses in the area. Conflicts with recreational uses are of particular concern and should be addressed.

RESPONSE: No land uses are planned nearby other than the PLES I Geothermal Project proposed for immediately south of the MP II & III site. No recreational uses are planned for the area.

SOCIOECONOMICS - HOUSING

COMMENT:

Page 4-47. The number of temporary and permanent housing units in the area as well as the vacancy rate for each category should be specified. Given the lack of data on how many workers will be from the local area, the population figures used to determine the additional housing required should be calculated on the minimum local employment scenario. Alternatively, an analysis of workers needed by trade compared to locally available workers in those trades could provide a more specific estimate of nonlocal employment and thus housing needed. (CEC)

RESPONSE: The large local construction sector and the high percentage of entry level jobs indicate a strong likelihood of local area employment (see 3.3.2.3 and Table 3-10). The minimum local employment scenario (page 4-47) is presented as a worst case; it is unlikely to occur.

The immediate housing market is about 11,000 housing units. About 4,500 are used as permanent housing and 6,500, mainly condominium units, as temporary housing. The vacancy rate for permanent housing is around 2-3%. The vacancy rate for temporary housing varies greatly with the seasons and day of the week. The lowest vacancy rates occur during the weekends of the winter skiing season and the highest during the weekdays in the spring and fall.

COMMENT:

Page 4-48, paragraph after Table 4-14. This infers that a demand for housing is a negative impact, however this may not be the case during certain seasons and bad snow years. (BLM/USFS)

RESPONSE: Noted.

COMMENT:

Page 4-48, bullet at bottom of page. In the interests of the reduction of housing needs, construction activity should also be timed so as not to coincide with Mammoth/Chance construction nor PLES construction if these projects are implemented. (Sierra Club)

RESPONSE: Were the period of construction activity to be significantly lengthened, with the construction workers moving on from one geothermal project to the next over several years, the character of the construction workforce's housing demands would change from the abundant, temporary nonwinter housing to less abundant permanent housing causing a greater demand for housing construction.

COMMENT:

Page 4-48. The EIR/EA states that construction of some additional housing can be expected due to the project. However, the text does not state whether this additional housing would constitute a significant environmental impact. The document should make a determination on this issue. (CEC)

RESPONSE: See page 5-1. The impact on housing is not significant.

COMMENT:

Page 5-14. The document states that "simultaneous construction of two plants could tighten the housing market." The document should quantify the effect on the housing market and assess whether this effect would constitute a significant environmental impact. The EIR/EA should also provide the specific reasons(s) for including only Mammoth Pacific II & III and PLES-I from among the proposed projects in the Mammoth Lakes area in the assessment of cumulative housing impacts. (CEC)

RESPONSE: The cumulative demand for housing from all five proposed geothermal plants would be about 30 units, less than 0.7% of the permanent housing market and less than 0.3% of the overall housing market. The overall impact on housing would not be significant.

Simultaneous construction of two geothermal plants could temporarily tighten the market for nonpermanent housing with a worst case of an average of 86 workers seeking temporary housing, peaking with 164 workers (see Section 4.1.3.2.3). While this demand could prevent rents from falling to their usual off-season lows, its temporary nature would not provide an incentive for developing additional housing. The increased demand would not result in a significant environmental impact.

SOCIOECONOMICS - ECONOMICS

COMMENT:

There should be much more economic detail, especially about the direct costs and benefits of the project to the County. (Planning Commission)

Page 4-52. It is suggested that the proposed plants, MP-II and MP-III, will generate costs that are greater than the funds that will be received by the county and special fees should be charged to cover costs for services provided. On page 3-54, section 3.3.2.4. County Fiscal Considerations, it is noted that the County receives 20% of the geothermal lease and royalty revenues from federal lands within its borders. In the economic impact section (page 4-51), no mention is made of funds the county will receive from the geothermal wellfield located on Federal Lease Number CA-1667A which will supply

MP-III. It is estimated that MP-III would generate about \$100,000 in Federal County of Origin funds during the first full year of operation for the County. The adjoining PLES-I development on Federal Lease Number CA11667 would also generate about \$95,000 for the County in County of Origin funds. Annual property taxes on the MP-II and MP-III are estimated at \$300,000 per plant, plus taxes from MP-I and PLES-I are estimated at \$500,000. Therefore, the proposed plants at Casa Diablo would provide over \$1.3 million annually in revenue to the County. Given these funds, the total development at Casa Diablo could generate approximately 10% of the County's operating income. Using the County labor force figure of 5,559 as shown on page 3-52, less than 1% of the County's labor force (i.e., less than 56 people) would be employed at Casa Diablo. On this basis, it appears that the proposed projects would be paying ten times its proportional share based on employment. On an income-revenue basis, these proposed plants appear to be very advantageous to the County. (MP)

RESPONSE: Geothermal lease and royalty revenues to the county are mentioned on page 4-51 and explained on pages 3-53,54. With information now available from the project sponsor, the estimated annual geothermal lease revenues to the county for one plant in full operation could range from \$80,000 to \$160,000, with \$100,000 as a likely figure. With both plants in operation, the revenues could range from \$160,000 to \$320,000 with \$200,000 as a likely figure. The revenues from other geothermal plants (MP I and PLES I) are not relevant in addressing the revenues expected from MP II and MP III (see Table 1).

The community service providers have indicated that, except for firefighting equipment for the fire district and an Environmental Compliance Office and equipment for the County's Energy Management Department, they have the capacity to handle the increase in services required without and increase in staff or significant equipment needs. Thus the actual increase in county costs as a result of just MP II and MP III would be very low (see Table 2).

An alternative method of estimating community service costs is to use the per capita cost of the general budget. This method would overstate the actual cost of the Mammoth Pacific project by itself, but may be justified in a more summative perspective (see Table 3). Based on the 1985-86 General Budget, the county expenditures were about \$13,500,000 and the county population was about 9,200. Therefore, the per capita expense was approximately \$1,500. The worst case scenario, with no local hiring, has the population increasing by an average of 108 persons for 9 months during the construction phase of each plant, and by 14 persons during the permanent operating phase. Based on a per capita expense of \$1,500 per person, the annual county expenditures would be about \$122,000 ($\$1,500$ per person per year \times 108 persons \times 3/4 of a year) during construction of MP II; \$143,000 ($\$1,500$ per person per year \times 108 persons \times 3/4 of a year + $\$1,500$ per person per year \times 14 persons \times one year) during MP II operation and construction of MP III phase; and \$42,000 ($\$1,500$ per person per year \times 28 persons \times one year) during the operational phase. See Table 4-14 for population estimates.

In addition, based on property tax per student, the local cost of each student is \$2,400 per year. The greatest concentration of construction workers would occur in the summer when school is out, however, the worst case costs would be \$86,400 ($\$2,400 \times 36$ students) during construction of MP II, \$96,000 ($\$2,400 \times 40$ students) during operation of MP II and construction of MP III, and \$19,000 ($\$2,400 \times 8$ students) during the operational phase. See Table 4-15 for student population estimates.

Annual general expenditures and school expenditures would be about \$239,000 during operation of MP II and construction of MP III, and \$61,000 during the operation phase. Annual lease and tax revenues during the operation phase would be about \$670,000 (see Table next page).

It should be noted that the geothermal lease revenue is restricted in how it can be spent, and that the tax revenue is divided between the county, the school district and special districts. Of the \$470,000 in property tax revenue, about \$211,000 would go to the county, about \$155,000 to the school district and about 131,000 to special districts. The greatest costs to the county would occur during the construction phase and the greatest revenues during the operational phase. Whether the project is financially advantageous to the county is dependent upon the loss, if any, of geothermal heat/water to Hot Creek Gorge and the Hot Creek Fish Hatchery

TABLE 1: ECONOMIC BENEFITS

MONEY PAID DIRECTLY TO COUNTY

Annually

Geothermal lease	\$200,000
Property Tax	\$470,000

TOTAL ANNUAL LEASE AND TAX REVENUE	\$670,000
------------------------------------	-----------

One Time

Fees are unknown but expected to cover costs
 Contribution to Special Mitigation Fund unknown. It may cover one-time fire mitigation payment, cost of supporting LVHAC and monitoring program, cost of an Environmental Compliance Officer and equipment, and other mitigation measures may be jointly funded by project sponsors in the area.

MONEY SPENT IN LOCAL AREA

Direct Spending	\$300,000
Local Employee Payroll	\$1,100,000
Spending by Non-local Employees	\$1,000,000

TABLE 2: POTENTIAL COSTS

	<u>Annual/a/</u>	<u>One-time</u>
Police	Nil	Nil
Medical	Nil	Nil
Fire	Nil	\$30,000
School	\$500-2,400 per student	Nil
Water	Nil	Nil
Waste	Nil	Nil
Administration	\$34,000	\$3,000
Hatchery/b/	0 to \$19,000,000	Nil
Recreation at Hot Creek/c/	0 to \$1,000,000	Nil
Visual Degradation	Nil	Nil
Permit Processing	Covered by Fees	

/a/ Nil does not indicate Zero Cost, but a cost that is not considered significant by the service providers.

/b/ \$19,000,000 is loss associated with complete loss of hatchery.

/c/ The \$1,000,000 assumes complete loss of usage of Hot Creek, fishing, swimming, guided tours and sight seeing, and does not include the loss of about \$2,000,000 in angler days already incorporated into potential loss from the Hot Creek Hatchery. It is expected that the monitoring plan and mitigation measures would not allow this to occur, but it remains a potential impact.

TABLE 3: WORST CASE PER CAPITA COSTS

	<u>Per Capita Costs</u> <u>of MP II</u> <u>MP III construction</u> <u>phase</u>		
County	\$122,000	\$143,000	\$42,000
School	<u>86,000</u>	<u>96,000</u>	<u>19,000</u>
TOTAL	\$208,000	\$239,000	\$61,000

COMMENT:

Page 4-52. This is abit hard to swallow considering we're talking about a short-term influx of a max 200 employees and a probable long-term influx of 12 employees in a town that caters to over 20,000 skiers a day in the winter (which equals approximately 30,000 people). (BLM/USFS)

RESPONSE: Noted.

COMMENT:

EIR should more fully discuss economic value of hatchery to the County. (CDFG,LJ)

RESPONSE: See pages 3-51, 3-52, 3-53, 4-49, and 4-50 in the Draft EIR.

COMMENT:

Mammoth Pacific should post bond to cover abandonment or any damage to aquatic resources. (LJ)

EIR should provide a full discussion of a bond or other mechanism being posted to cover any loss in hatchery production or aquatic fauna. CDFG recommends the posting of such a bond. (CDFG)

RESPONSE: Comment noted. The posting of phased bonds to cover costs in case of abandonment is a fairly common construction practice and should be considered as a possible fiscal mitigation. The posting of a full bond for all possible damages to aquatic resources would not be economically feasible. Such a bond might be in excess of \$200 million.

COMMENT:

Page 4-49, third paragraph. There are very few trout at the gorge hot springs per se. (BLM/USFS)

RESPONSE: Noted.

COMMENT:

EIR should discuss economic loss due to degradation of visual environment.(LJ)

RESPONSE: Because the site is not a tourist destination, is not visible from the nearby tourist destinations (e.g., Hot Creek Gorge, Shady Rest Campground, Sherwin Creek Campground, and Little Antelope Valley) and the view from near the site also encompasses numerous other man-made visual features (e.g., Mammoth Pacific I, electricity transmission lines, gas and propane storage tanks, county impound yard, and the Southern California Edison Substation, see 3.3.1.4, p. 3-46), there is unlikely to be an economic loss due to changes in the visual environment.

COMMENT:

EIR should give cost to administer and monitor geothermal projects. (LJ)

RESPONSE: As stated in 4.1.3.2.3, p. 4-52, the county's experience with geothermal projects has not been extensive enough to estimate all costs. However, a \$2,000 application fee is paid for processing the use permit and a 2 1/2% of total EIR cost for processing the EIR, about \$2,000. The actual cost of processing the EIR, however, may be closer to 5% of total cost. A noise meter costing \$2,000 to \$3,000, and an Environmental Compliance Officer (full-time for the first year, part time for following four years) with an annual full-time cost of about \$24,000 in wages and \$10,000 in fringe benefits annually for full-time work, would be required if the MP II & III project is approved. No additional personnel or equipment is believed to be required if PLES I and the Mammoth/Chance geothermal projects are developed, although if these other projects are also built, their sponsors would contribute funds to support the Compliance Officer. The Mono County Energy Management Department and the geothermal developers are currently discussing a mitigation payment by developers for these costs, the division of which between producers would be based on Megawatt production. The Geothermal Lease Fund provides 40% of the funding for the County's Energy Management Department.

SOCIOECONOMICS - PUBLIC SERVICES

COMMENT:

Page 5-3. The EIR/EA should provide the specific reason(s) for including only Mammoth Pacific II & III PLES-I from among the proposed projects in the Mammoth Lakes area when assessing cumulative impacts to public services. (CEC)

RESPONSE: See page 5-3 in the Draft EIR.

COMMENT:

Page 5-14. The EIR/EA state a that the cumulative public service demand caused by the simultaneous construction of two plants "would probably exceed a 'threshold' level and require the addition of fire, police and school personnel." These potential impacts should be quantified, their significance assessed, mitigation discussed, and the significance of residual impacts described. (CEC)

RESPONSE: As stated, the effects "would probably exceed a threshold level". Supervisory personnel for police, fire and school services indicated that the addition of personnel and equipment (except fire equipment) is not likely to be required and that the exact point of addition can not be quantified. Quantification of the impacts in terms of the number of construction workers, operators and family size can be derived by multiplying the figures found in 4.1.3.2.2, p. 4-46,47,48. Except for fire services, these impacts would not be significant.

COMMENT:

The draft EIR/EA should address methods for disposal of liquid or solid waste that could result from construction or operation of the proposed facility. Some wastes may be hazardous and require special disposal practices. (CEC)

RESPONSE: Disposal of liquid waste would be handled by pump truck and solid waste by other truck (see page 4-11). All waste, including potentially hazardous wastes would be handled in accordance with the standards of the Lahontan Regional Water Quality Control Board and disposed in an appropriate method at a legal point of disposal. The exact method of removal and disposal of any hazardous material would depend on the nature of the hazardous material involved and the extent of any contamination. Reserve pits (see page 2-9) and bermed, emergency containment basins (see page 4.7) would be in place to hold the wastes. The need for and emergency spill containment plan is noted on page 4-2. Properly handled, the effects of disposal operations are not expected to cause a significant environment effect in and of themselves.

COMMENT:

Page 3-57. The area is rated as a high fire hazard as a result of seasonal conditions, not all the time. Mutual aid agreements are illegal. (BLM/USFS)

RESPONSE: Fire hazard noted. Neither the USFS nor BLM participates in the state-wide Master Mutual Aid Agreement. The USFS can and does enter into cooperative agreements with surrounding fire jurisdictions. The phrase "or cooperative" should be inserted after "Mutual aid".

COMMENT:

See attached letter from George Lucas, Chief, Long Valley Fire Protection District.

RESPONSE: Noted.

RECREATION

COMMENT:

How many visitor days occur at Hot Creek? (SQ)

RESPONSE: See page 3-59 in the Draft EIR.

COMMENT:

Page 4-61. first paragraph. Worst case analysis is not required under NEPA (or CEQA, is it?). To analyze a situation determined as unlikely in this document, 2) which would take 100 years to begin to affect this feature, 3) with a proposed early warning system and 4) mitigation such as reduce pumping, relocate injection, or ultimately plat shutdown available to us, then go directly to dried up springs is misleading at best. (BLM/USFS)

RESPONSE: This is not necessarily a worst case analysis. It is, however, an acknowledgement that there is considerable uncertainty over how fluids move in the geothermal reservoir(s) between the Casa Diablo and Hot Creek areas. It is impossible to say that the mitigation measures would be totally and unconditionally effective at protecting the reservoir supplying the hatchery and Hot Creek Gorge.

TIMBER RESOURCES

COMMENT:

Page 4-63, fourth and sixth bullets. All these fences plus well head fences are going to add up to a big visual impact. SF 35-32 is doing just fine without a fence. (BLM/USFS)

RESPONSE: Noted.

COMMENT:

Page 4-62. The EIR/EA should assess whether the specific effect of harvesting timber due to the project would be significant either before or after proposed mitigation. (CEC)

Page 5-15. The document should assess whether the cumulative impact of harvesting would be significant either before or after mitigation. (CEC)

RESPONSE: See page 5-1. Effects on timber are not significant.

COMMENT:

Page 5-3. The EIR/EA should also provide the specific reasons(s) for including only Mammoth Pacific II & III and PLES-I from among the proposed projects in the Mammoth Lakes area in the assessment of cumulative impacts to timber resources. (CEC)

RESPONSE: No timber loss would occur with the construction of the Mammoth Chance geothermal projects. It is beyond the scope of this report to discuss timber impacts of other projects which could have impacts orders of magnitude greater than those of the geothermal projects.

CULTURAL RESOURCES

COMMENT:

Page 4-64. We had a big problem with this--all it says is we did a survey but don't know where these features are. We required another survey and found no conflicts. BLM management was not willing to approve or disapprove without knowing if a conflict existed or not. The most common mitigation in cultural is relocation and relocation can result in multiple unknown new impacts.(BLM/USFS)

RESPONSE: The second survey referred to by the commenter was done on archaeological site PLES-10 with reference to the PLES I project. This document is referring to archaeological sites PLES-8 and PLES-9. Linda Reynolds, the USFS archaeologist who did the second survey, did not visit PLES-8 and PLES-9 during that survey (Reynolds, 1987). As stated in the Draft EIR on page 4-64, it would be necessary to visit the sites again to more precisely locate the cultural resources.

COMMENT:

Page 4-64. A qualified archaeologist with the authority to halt construction should be on-site during the construction phases to monitor and map existing or new cultural sites as well as gather data. (FS & LJ)

Page 4-65. The recommendation that "to the extent possible, an effort be made to monitor development activities that may uncover buried cultural deposits" is too vague to ensure protection of potential resources. Either a qualified cultural resources specialist should be on site to monitor subsurface disturbance, or an approved training program for employees should be required, with a qualified cultural resources specialist to be called in to assess any resources discovered during construction. If human remains are discovered, the County Coroner must be notified, and if the remains are of Native Americans, a local Native American representative must be consulted as to proper treatment of the remains. (CEC)

RESPONSE: Noted.

COMMENT:

Page 4-65, fifth paragraph. Inconsistent with the recreation section--this project is not expected to increase recreation use. (BLM/USFS)

RESPONSE: Acknowledged. Recreational use is not likely to increase. The impact should state that new roads may improve access to areas where cultural resources are located, making it more likely that the general public would find them.

COMMENT:

Page 4-65, third bullet. This would negatively affect Native American access. (BLM/USFS)

RESPONSE: Noted

COMMENT:

Page 4-65, last bullet. Usually archaeologists would rather not make cultural sites known to the general public as it can result in increased collecting. (BLM/USFS)

RESPONSE: Noted.

COMMENT:

Page 4-66. The draft EIR/EA should address the potential depletion of thermal springs as a potential impact to the traditional Native American interests. (CEC)

RESPONSE: See discussion of monitoring program and resulting mitigation measures in hydrology section of the DEIR (pages 4-18 through 4-21) and in the response to comments on the hydrology section of this document.

TRANSPORTATION AND ACCESS

COMMENT:

Page 4-66. The traffic, including heavy equipment, created by the project should be quantified. Current traffic levels on local roadways as well as anticipated nonproject levels during construction should be quantified. An assessment should be made of the impact of project-related traffic on local traffic conditions, considering the effect of the proposed mitigation. (CEC)

RESPONSE: None of the traffic impacts of the geothermal projects would be considered significant, singly or in the cumulative case.

IV. REFERENCES CITED

Bay Area Air Quality Management District November 1985. Air Quality and Development Guidelines for Assessing Impacts of Projects and Plans. Page VI-19.

California Air Resources Board. July 3, 1987. Daily Average Emissions for Iso-Butane: ARB Emissions Data for Inventory Year 1985.

Holland, R.F. 1986. Preliminary Descriptions of Terrestrial Natural Communities of California. Department of Fish and Game, Sacramento, California.

Reynolds, Linda -- Archaeologist, Inyo National Forest. 1987. Telephone conversation September 25, 1987.

Warner, Susan et al. 1986. Storage, Transport, and Spills of Hazardous Materials in the Russian River Basin. Regional Water Quality Control Board, North Coast Region, Santa Rosa, California.

V. DISTRIBUTION OF DRAFT EIR

Bureau of Land Management
California Energy Commission
California Department of Fish and Game
California Division of Oil and Gas
California State Clearinghouse
California Trout
Eastern Sierra Audubon Society
Environmental Management Associates (formerly Carey and Thomas)
Great Basin Unified Air Pollution Control District
Lisa Jaeger
Long Valley Fire Protection District
Mammoth-Pacific
Mono County Board of Supervisors
Mono County Planning Commission
Mono County Planning Department
Mono County Public Library
Regional Water Quality Control Board
Frank Stewart
Sierra Club
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. Geological Survey

VI. WRITTEN COMMENTS AND HEARING SUMMARY

August 18, 1987

Don Lyster
Director Energy Mgt. Dept.

Please find enclosed our
comments regarding the Mammoth
Pacific Geothermal Development Project
Units II and III. Thank you for your
time and consideration.

Sincerely,

Frank Stewart
Lisa Gaezer

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MIDHD COUNTY
OFFICE OF CREDIT MANAGEMENT

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'AUG 19 1987

MONO COUNTY
OFFICE OF ENERGY MANAGEMENT

ABANDONMENT

pg 2-20

1. Swamp mucks should not be left in the swamps but should be disposed of at a Class II waste site if toxic

Alternative project

pg 2-22 The alternative plant location seems to be less visually sensitive as it can be partially screened by existing Jeffrey pines. This would be a preferred location.

pg 2-28

New Electrical transmission lines should be buried adjacent to road easements.

pg 3-21

Reduced noise levels at MP II III should be a design priority. A duplication of noise complaints associated with plant MP I is unacceptable.

pg 3-46

MP II, III will contribute to the continued degradation of the Hwy 395 scenic corridor.

4-25 Air Quality -

Although the air quality within the boundaries of the John Muir Wilderness area may not be affected, air pollution emissions may be viewed by visitors within the wilderness area.

pg 4-26 What will be the source of fresh-water needed to reduce construction dust. Perhaps reclaimed water from MCWD could be utilized.

pg 4-29 No more than 250 lb per day of isobutane should be allowed to escape into the atmosphere.

Biological environment.

pg 4-36 Seedling survival should be monitored and if less than 75% of seedlings have survived then replacement planting should be conducted. Three years is much too long.

pg 4-38

I have personally observed over 250 mule deer during spring migration/staging in the riparian area along Mammoth Creek just below the bridge over 395. The mule deer study makes no reference to the impacts on these animals due to noise during construction and operation. It's focus is too site specific when it only considers the dozens of deer that may pass directly thru the project site.

pg 4-40

Once again - the proposed mitigation is much too vague. How will the proponent reduce the maximum flow of geothermal fluid that may reach mammoth creek in the event of a major spill of geothermal fluid (As during an earthquake)

The detrimental effect on the catch & release section due to trout mortality from high water temperatures would be severe. In that event, a census of # and size of destroyed trout should be taken.

and the same size and species of fish replaced by the proponent responsible.

A similar mitigation should apply to impacts that may occur at the hatchery. A specific performance bond tied to riparian life destruction is in order.

Social environment

pg 4-43

All new power transmission lines should be underground to reduce visual impacts with revegetation of disturbed soil.

pg 4-44

The alternate site for MP II III should be used to reduce its visibility.

Fluid conveyance lines should be concealed behind beams along adjacent road easements.

In general MP I is a very poor example of the proper proponent's sensitivity to the high visual quality associated with the Eastern Sierra region. I feel it is audacious

On their part to (on page 3-46) include
"the existing geothermal development"
as part of their justification of the other
visual pollution in the area.

In light of Mammoth Pacific's track
record in this area, a full & detailed
visual impact analysis including revegetation
and the use of seeding etc. should be
submitted prior to the issuance of the
CLP.

pg 4-61 Impact
A significant mortality of trout
in Hot creek is not a temporary effect.

pg 4-64 A qualified archaeologist
with the authority to halt construction,
should be on-site during the construction
phases to monitor & map existing or new
cultural sites, as well as gather data.

Overview of Impacts

pg 5-1 As the MP II, III geothermal power plants are in direct conflict with the USFS VMO of "retention" I urge that the no-action project alternative be adopted.

Cumulative Impacts

pg 5-6 As the EIR correctly points out, the probability of contamination from spills to surface water increases with each additional power plant installed or under construction. . . .

pg 5-9 Air Quality
the cumulative amt of construction time for constructing all proposed Geothermal plants of 4 years is considerable.
The impact on regional air quality when viewed in this light is considerable. Perhaps tighter constraints on air quality during the construction phases is necessary.

Visual Resources

pg 5-12?
5-14 }

Is the appearance of
an "Industrial park" type of
viewscape appropriate for Eastern Sierra
visitors just as they are exiting 395?
Since Recreation is certainly the emphasis
of our regional economy, and further
Geothermal Development and the continued
industrialization of the Long Valley area
is in direct contrast with these economic
and aesthetic values, We strongly
recommend a no-project alternative
For Mammoth Pacific I and II

Sincerely

Frank Stewart

Jisa Jager

Memorandum

To : Dr. Gordon F. Snow
Assistant Secretary for Resources

Date : August 24, 1987

Mr. Daniel Lyster
Mono County Energy Management
P. O. Box 8060
Mammoth Lakes, CA. 93546

Subject: SCH No. 86112408
Mammoth Pacific II & III
Geothermal Project,
DEIR, Mono County

From : Department of Conservation—Office of the Director

The Department of Conservation, Geothermal Section of the Division of Oil and Gas has reviewed the subject environmental document. Because geothermal well permits must be issued by the Division prior to drilling, we should be considered a responsible agency. We offer the following comments:

Page 1-3, Environmental Category, Geology, Geologic Hazards, and Soils:

The following statements about the hydrothermally altered rock at, and near the proposed drill sites should be included. The area of concern has a history of impacts from previous drilling activity.

Major Impacts: The proposed project is located in an area of hydrothermally altered rock and the well sites may be affected by unstable ground.

Mitigation Measures: A geotechnical report for the drill sites will be required by the Department of Conservation, Division of Oil and Gas, prior to the issuance of a permit. This report should be included in the Final EIR.

Expected Results of Mitigation: The potential impacts of drilling and production can be reduced by proper well siting and well construction as determined by the geotechnical report.

Page 2-20, third paragraph: "The sumps would be drained of liquids and these liquids would be trucked to a reinjection well or, if toxic, disposed of at the Class II waste site."

Clarification is needed on this statement. The geothermal injection wells are permitted by the Division of Oil and Gas. However, the injection wells are only permitted to inject produced geothermal fluids. If the sump liquids are to be injected into the geothermal injection wells, waste discharge requirements may be required by the Regional Water Quality Control Board; this operation is not covered by the Division of Oil and Gas permit.

If you have any questions, please contact Robert Habel at the Division of Oil and Gas, Geothermal Section, 1416 Ninth Street, Room 1310, Sacramento, California 95814; telephone (916) 323-1786.

RECEIVED

Dennis J. O'Bryant
Dennis J. O'Bryant
Environmental Program Coordinator

SEP 08 1987

RSH:DJ0:sr

cc: R. Habel
R. Reid
OFFICE OF ENERGY MANAGEMENT



United States Department of the Interior

GEOLOGICAL SURVEY

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AUG 28 1987

August 24, 1987

MONO COUNTY OFFICE OF ENERGY MANAGEMENT

Dan Lyster
Mono County Energy Management Department
P.O. Box 8060
Mammoth Lakes, California 93546

RE: COMMENTS - Draft EIR/EA for Mammoth Pacific Geothermal Development
Project Units II and III

The following comments are submitted regarding the subject report.

Models of Thermal Fluid Flow

The claim is made on p. 3-7 and 4-12 that the Upwelling/Fracture Flow Model implies that there is no hydraulic communication between the Casa Diablo area and thermal springs at the Fish Hatchery and Hot Creek gorge. This claim would not be valid if hydraulic communication existed between these areas via deeper, hotter reservoirs and the faults which provide conduits for upflow of thermal water. I don't feel either model precludes the potential for adverse impacts on thermal springs.

Simulated Reservoir Performance Calculations

Some discussion is needed in this section (p. 4-13 to 4-15) of the basis for assuming complete hydraulic communication between injection and production zones because the effects of injection dominate these simulations. The GeothermEx (1986) report, in fact states (p. 4-18) that it is unlikely that recharge (i.e. pressure support) is provided by reinjection because production and injection zones are separated by 500 to 700 feet of relatively impermeable rhyolite. The model results show pressure rises east of Casa Diablo - what effects would that have on spring flows?

Bulk Model Calculations

Calculations of the rate of propagation of a cold temperature front (1400 ft in 30 yrs - p. 4-16) suggest that the front could reach the vicinity of the nearest production well (650 ft) at Casa Diablo in less than 10 years. Some discussion is needed of the possibility that premature breakthrough of cold water could limit the productive life of the field. The value used in these calculations for the reservoir width should be stated.

Colton Spring Area springs

Of the three thermal springs in the Colton Spring area noted on p. 3-13, only Colton Spring itself is continuously monitored.

Fish Hatchery Area springs

Spring discharge at the Fish Hatchery appears to be relatively constant only during the late fall and winter. Continuous measurements in 1985 and 1986 show that the peak flows in July of each year were 32% and 75% greater than the wintertime flows at the AB spring group.

Mike Sorey
Research Hydrologist
U.S. Geological Survey
Menlo Park, California

Memorandum

To : 1. Projects Coordinator
Resources Agency

2. County of Mono
Energy Department
P.O. Box 8060
Mammoth Lakes, CA 93546

Date : August 26, 1987

RECEIVED

SEP 08 1987

From : Department of Fish and Game

MONO COUNTY
OFFICE OF ENERGY MANAGEMENT

Subject: Draft EIR: Mammoth Pacific Geothermal Development Project: Units II and III, Mono County - SCH 86112408

Department of Fish and Game (Department) biologists familiar with the project area have reviewed the Draft EIR for Units II and III of the proposed Mammoth Pacific Geothermal Project. We find this project poses serious certain and potential threats to the wildlife ecology of Mammoth and Hot creeks and to the existence of certain plants and animals residing in hot springs, artesian springs, and surface waters in and around the project area. Due to the overwhelming recreational values of the Mammoth Lakes/Long Valley area and the long-term adverse impacts of this project, we recommend adoption of the "No Project" alternative. Our comments on the Draft EIR are as follows:

Wildlife

Although this project by itself appears to present limited direct impacts to the wildlife resources on site, closer scrutiny of the current deer survey indicates significant cause for concern.

1. Page 3-37: A more accurate picture of deer migration over the Sierra Crest would include mention of Deadman Pass and San Joaquin Ridge as key migration routes.

Additional discussion of the importance of spring migration habitat to herd viability is required. The fact that does are carrying fawns in the spring and therefore are particularly vulnerable to stresses and disturbances, such as new developments on or near migration pathways, should be stressed in the discussion.

2. Page 4-38: Though some negative impact from pipelines and fencing is unavoidable, we concur with the stated mitigation to design these obstacles so as to minimize the impact. Even so, some migratory deer impacts will still occur through

3. Page 4-67: Due to its greater unavoidable impacts, we oppose the alternative location proposal.
4. Page 4-72: We favor the "No Project" alternative in order to prevent unmitigable adverse impacts to hydrological, biological, and recreational resources.
5. Page A-3 (Appendix): We concur with the environmental checklist, item 5-C, that the project will result in a barrier to animal movements. This impact is not mitigable to a level of non-significance.
6. Appendix C, Page C-14: We concur with the methods and findings of the deer migration study. However, the interpretation that deer show preference for the less developed portions of the area is substantiated by prior collection of information by the Department on deer migration. Considering historic deer migration use, a more accurate interpretation would be that deer actively avoid the existing MP I power plant due to noise and visual impacts and the presence of substantial physical barriers in the form of fences and pipelines. This avoidance response effectively results in project impacts to deer use area beyond that physically occupied by project features.
7. Appendix C, Page 7, C-19: The apparent avoidance of development by deer demonstrates the importance of further considering cumulative impacts of additional projects such as MP II and MP III. As projects multiply, habitat options for various wildlife species decrease, unavoidably causing stress and direct losses to wildlife populations. To quantify such losses, we recommend that all geothermal development project approvals in the area be kept in abeyance until an areawide study of cumulative impacts to all natural resources, including deer, can be completed by the permitting authority. Such a study would allow decision makers to recognize those projects which provide for retention of aesthetically and economically important natural resources and those that do not.

Fisheries

Temperature, flow, and water chemistry of the head springs of Hot Creek Hatchery.

Pressure decline within the hot producing zone due to power plant operation can affect flow patterns to other areas within the Long Valley Known Geothermal Resource Area (KGRA). Thus far wells MBP-3 and MBP-5 have shown some decline in productivity index, indicating pressure loss. However, direct pressure changes are still undetermined due to changes in monitoring equipment. Accurate measurements of pressure changes are necessary and should

be documented prior to construction of additional power producing plants. Also, additional monitoring wells, as mentioned in Section 2.3.4 (page 42-45) should operate without the influence of further development for several years to establish baseline data, and if possible, to determine whether these wells provide an accurate assessment of pressure changes due to plant operations.

We are concerned over the cumulative effects of overall geothermal development in the Long Valley KGRA on the temperature gradient throughout the basin. Although one project by itself might seem to exert no theoretical impact, we are concerned over the impact of several such projects. It must be recognized that the recreational demand on the area will increase annually, and it will be substantial over the 30-year life of the project.

Impact to Casa Diablo Geyser, hot springs, artesian springs, and surface waters.

Page 3-31. The operation of the existing MP I plant has apparently disturbed the natural discharge rate of the Casa Diablo Geyser to such an extent that since April of 1987 this geyser spring has ceased to flow. Obviously any plant or animal life which at one time relied upon this spring source has been adversely affected. Our concern over the loss of other hot springs, artesian springs, and surface waters in the area of influence of the proposed project extends to all aquatic resources present, including endemic plants and animals. An exhaustive basin-wide survey on all known hot springs, artesian springs, and surface waters should include all associated habitat types and provide complete lists of all plants and animals present. This is necessary, for without even listing their names and the quantity of habitat potentially to be lost as a result of temporary or permanent disruption of flows, it will be impossible to develop measures capable of preventing their loss.

Page 4-39. No impacts to the Casa Diablo Geyser, hot springs, artesian springs, or surface waters relating to loss of habitat were identified, yet the potential for this loss exists.

Discharge of hot geothermal fluids in Mammoth and Hot creeks.

Page 28, Technical Appendix: The Department documented a decrease of natural biota as the result of excessive silt from Casa Diablo thermal well discharge into Mammoth Creek in 1960. The 1962 incident further exacerbated an already existing water chemistry problem.

The document fails to discuss the provision of containment facilities in areas where pipe ruptures could release several

thousand gallons of hot geothermal fluids into creeks. The temperature effects of such a slug of hot fluid would be catastrophic to trout and invertebrate populations in Mammoth Creek, and perhaps, Hot Creek, a recognized blue-ribbon trout stream. Full recovery of the fish and invertebrate populations would require several months to a year and may never completely achieve the ecological balance present before the spill if more than temperature effects are involved.

The water quality characteristics of the fluids contained in the geothermal wells (Table 1-3) are such that they would significantly impact aquatic resources should a pipeline rupture or spill of these fluids occur. Specifically, the concentrations of arsenic (0.1 to 2.5 mg/L) and mercury (1.2 to 2.6 mg/L) pose the greatest threat. EPA's 1986 Quality Criteria for Water specifies concentrations for various water quality parameters. Arsenic concentrations should not exceed 0.19 mg/L and mercury should not exceed 0.00014 mg/L once every three years. Should an accident occur in the project area, concentrations of both these metals in existing waters could be exceeded in a relatively short period of time. The long-term impact to the downstream resources as well as to the use of these resources by sportsmen could be devastating.

Page 40 of the EIR/EA.

Proposed mitigation does not identify how the developer plans to keep hot geothermal fluid from entering Mammoth Creek in the event of pipe rupture. Therefore, mitigation for this potential occurrence has not been identified.

Appendix A-3, #5 Animal Life.

This project has the potential to change the diversity and/or number of species of animals present throughout the Long Valley KGRA, not only within the project area as stated in the document. However it has not yet been determined if there exists within this potentially affected area any unique, rare, or endangered invertebrate species. Therefore, it is necessary to survey all hot springs, artesian springs, and surface waters in the Long Valley KGRA in order to inventory all aquatic oriented animals including fish, reptiles, amphibians, and invertebrates.

A Long Valley Technical Advisory (Hydrological) Committee is being formed under the auspices of the Mono County Energy Department to provide a monitoring plan to assure the protection of all environmental concerns resulting from geothermal development. By means of this letter, the Department requests that effective enforceable safeguards be built into the monitoring plan to protect the jeopardized natural resources.

The Department recommends the "No Project" alternative until a cumulative impact analysis of all geothermal projects in the Long Valley KGRA is completed. We can no longer concur with piecemeal consideration of similar projects or project phases that may result in cumulative long-term adverse impacts to the important biological, hydrological, and recreational resources of the area.

Thank you for the opportunity to review and comment on this project. If you have any questions, please contact Fred Worthley, Regional Manager of Region 5, at 245 W. Broadway, Suite 350, Long Beach, CA 90802-4467, or by telephone at (213) 590-5113.

Edward O. Willis
for Pete Bontadelli
Acting Director

Ellen Hardebeck
Control Officer



SEP - 8 1987

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

157 Short St. Suite #6 - Bishop, CA 93514
(619) 872-8211

August 31, 1987

Mr. Dan Lyster, Director
Mono County Energy Management Dept.
P.O. Box 8060
Mammoth Lakes, CA 93546

Dear Mr. Lyster:

We have received the Draft EIR/EA on the Mammoth Pacific Geothermal Development Project: Units II and III, and have the following comments:

1. page 3-30: GBUAPCD has no permit program for wood-burning devices
2. page 4-27: GBUAPCD will require mitigations on flow tests of wells so that H₂S emissions will not exceed emissions limits and ambient standards. The long-term test flows should be run through the existing MP-1 plant and reinjected as will be done for the PLES-1 flow tests.

Thank you for this opportunity to comment.

Sincerely,

Ellen Hardebeck
APCO

EH/dl

RECEIVED

SEP 03 1987

MONO COUNTY
OFFICE OF ENERGY MANAGEMENT

CALIFORNIA ENERGY COMMISSION

1516 NINTH STREET
SACRAMENTO, CA 95814

RECEIVED

SEP 10 1987

MONO COUNTY
OFFICE OF ENERGY MANAGEMENT

September 3, 1987

Mr. Daniel Lyster
Mono County Energy Management
P.O. Box 8060
Mammoth Lakes, CA 93546

Dear Mr. Lyster:

Re: Comments on the Draft Environmental Impact Report/Environmental Assessment for the Mammoth Pacific Geothermal Development Project: Units II and III (SCH# 86112408)

The California Energy Commission (CEC) staff has reviewed the Draft Environmental Impact Report/Environmental Assessment (EIR/EA) for the Mammoth Pacific Geothermal Development Project: Units II and III. The staff offers the following comments for your consideration.

General Comments

Section 5.3.1.4 (Air Quality) of the draft EIS/EA indicates that six identical geothermal electrical generation units--Mammoth/Chance I & II, Mammoth Pacific I, II & III and Pacific Lighting Energy Systems I--will be developed in close proximity to each other and that each unit will produce 12 megawatts (MW) of electricity with a total power output of 72 MW. The CEC has exclusive permitting authority for all thermal power plants 50 MW or greater in capacity (Public Resources Code 25000 et seq.). As a multi-unit project, these units may fall within CEC jurisdiction. We are currently in the process of contacting the developers and gathering information which will assist us in making a determination on jurisdiction. We should be able to resolve this issue within 45 days.

The California Environmental Quality Act guidelines (Sect. 15126) require that an EIR identify and discuss the significant effects of a project. The draft EIR/EA does not consistently specify the significance of adverse impacts identified. In addition, while the document does suggest possible mitigation measures, it should also assess the residual impact level after mitigation, and which measures are actually proposed.

Mr. Daniel Lyster
September 3, 1987
Page 2

Biological Resources

The draft EIR/EA fails to provide adequate information on the existing biotic conditions or possible impacts on rare or endangered species or natural communities. The draft EIR/EA cites a "biotic assessment" by Dean Taylor and Richard Buckberg (1987) as the basis for the discussion on vegetation. However, this study was conducted at an inappropriate time of year (winter), without an appropriate level of study for impact analysis (D. Taylor, personal communication, 8/27/87). According to Dr. Taylor, these limitations are stated in his report, which was intended to be only a general scoping study. Although other supporting data were attached as appendices, the "biotic assessment" was not attached.

A detailed rare plant survey report which follows guidelines provided by the California Department of Fish and Game should be prepared to serve as a data base for assessing potential impacts to rare plants. Information should also be provided regarding disturbance to areas identified as "thermal marsh" and mountain meadow communities, as these may be wetlands and thus subject to state and federal policy. All wetland areas should be completely avoided. Wetlands areas that have been degraded without federal permits should be rehabilitated.

The draft EIR/EA should identify wildlife species that occur on or near the project site. Specific information on the occurrence of Sage Grouse on the project site (as opposed to a general discussion about the regional occurrence) should be provided.

Cumulative biological impacts of geothermal development in the Long Valley Geothermal Resource Area are not adequately addressed. A study of the cumulative biological impacts of this and other developments in this area should be completed prior to the approval of any additional power plants, and should be included in the data used to determine the cumulative impacts related to the proposed project.

Air Quality

The document, on pages 5-9 to 5-10, states that construction activities could cause new or continued violations of the state's ambient PM10 standard. This is likely to be considered a significant impact, yet there is no indication that impacts will be mitigated to the extent feasible. Additionally, the document states, on page 5-9, that the facility may emit 1,500 to 6,000 lbs/day of non-methane hydrocarbons. This may also be considered to be a significant impact. It is unclear that this impact will be mitigated to the extent feasible.

Mr. Daniel Lyster
September 3, 1987
Page 3

Public Health

The draft EIR/EA states, on pages 4-30 to 4-32, that substantial emissions of both H₂S and isobutane could result during upsets of the facility. Ambient concentrations that would result from such events should be compared to levels that are considered acceptable for public exposure. Criteria used to gage such exposures should consider the effects on sensitive members of the general public.

The geothermal fluid released during upsets can contain trace amounts of arsenic, lead, and mercury. The resultant public exposure to these pollutants should also be evaluated.

Noise

From information in the draft EIR/EA it is unclear what project-related noise levels will occur off-site, or if such levels will conflict with proposed land uses around the proposed facility. An analysis of noise levels at the property lines of the proposed facility should be provided, and noise levels that are acceptable for the proposed use of the surrounding lands should be identified and discussed.

Waste

The draft EIR/EA should address methods for disposal of liquid or solid waste that could result from construction or operation of the proposed facility. Some wastes may be hazardous and require special disposal practices.

Visual Resources

The draft EIR/EA states (p. 4-46) that even with mitigations the plant would be noticed by casual observers and the project would therefore be inconsistent with the Visual Management Objective of "retention." However, the text does not state whether this inconsistency would constitute a significant environmental impact. The document should make a determination on this issue.

The document describes (p. 5-14) the cumulative visual effect of the project in combination with the existing Mammoth Pacific I project and the proposed PLES I project. However, it does not assess whether this impact would constitute a significant environmental impact, either before or after mitigation.

Mr. Daniel Lyster
September 3, 1987
Page 4

Land Use

The draft EIR/EA states (p. 4-46) that the project is compatible with current County and United States Forest Service plans, with the exception of the applicable visual resource management policies. However, the text does not discuss whether the project would conflict with existing and planned land uses in the area. Conflicts with recreational uses are of particular concern and should be addressed.

The document should assess whether the cumulative land use effect of "transforming several undeveloped areas to industrial uses" (pp. 5-14 to 5-15) would be a significant environmental impact, even though it would be consistent with Mono County and Inyo Forest Plans except for the Visual Management Objectives for the area.

Housing

The EIR/EA states (p.4-48) that construction of some additional housing can be expected due to the project. However, the text does not state whether this additional housing would constitute a significant environmental impact. The document should make a determination on this issue.

The number of temporary and permanent housing units in the area as well as the vacancy rate for each category should be specified. Given the lack of data on how many workers will be from the local area, the population figures used to determine the additional housing required should be calculated on the minimum local employment scenario (p. 4-47). Alternatively, an analysis of workers needed by trade compared to locally available workers in those trades could provide a more specific estimate of non-local employment and thus housing needed.

The document states that "simultaneous construction of two plants could tighten the housing market" (p. 5-14). The document should quantify the effect on the housing market and assess whether this effect would constitute a significant environmental impact. The EIR/EA should also provide the specific reason(s) for including only Mammoth Pacific II & III and PLES I from among the proposed projects in the Mammoth Lakes area in the assessment of cumulative housing impacts.

Economy

A determination should be made as to the significance of the potential depletion of geothermal water at the Hot Creek Fish Hatchery (p. 4-49). The feasibility of the proposed mitigation

Mr. Daniel Lyster
September 3, 1987
Page 5

measure of heating water with conventional fuels (p. 4-50) should be analyzed. The potential environmental impact of this mitigation should also be considered.

Public Services

The EIR/EA should provide the specific reason(s) for including only Mammoth Pacific II & III and PLES I from among the proposed projects in the Mammoth Lakes area when assessing cumulative impacts to public services (p. 5-3).

The EIR/EA states that the cumulative public service demand caused by the simultaneous construction of two plants "would probably exceed a 'threshold' level and require the addition of fire, police and school personnel" (p. 5-14). These potential impacts should be quantified, their significance assessed, mitigation discussed, and the significance of residual impacts described.

Timber Resources

The EIR/EA should assess whether the specific effect of harvesting timber due to the project (p. 4-52) would be significant either before or after proposed mitigation.

The document should assess whether the cumulative impact of harvesting (p. 5-15) would be significant either before or after mitigation. The EIR/EA should also provide the specific reason(s) for including only Mammoth Pacific II & III and PLES I from among the proposed projects in the Mammoth Lakes area in the assessment of cumulative impacts to timber resources (p. 5-3).

Cultural Resources

The recommendation that "to the extent possible, an effort be made to monitor development activities that may uncover buried cultural deposits" (p. 4-65) is too vague to ensure protection of potential resources. Either a qualified cultural resources specialist should be on site to monitor subsurface disturbance, or an approved training program for employees should be required, with a qualified cultural resources specialist to be called in to assess any resources discovered during construction. If human remains are discovered, the County Coroner must be notified, and if the remains are of Native Americans, a local Native American representative must be consulted as to proper treatment of the remains.

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Page 6

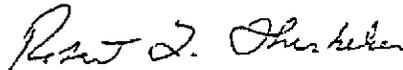
The draft EIR/EA should address the potential depletion of thermal springs as a potential impact to the traditional Native American interests referred to on page 4-66.

Transportation and Access

The traffic, including heavy equipment, created by the project should be quantified. Current traffic levels on local roadways as well as anticipated non-project levels during construction should be quantified. An assessment should be made of the impact of project-related traffic on local traffic conditions, considering the effect of the proposed mitigation (p. 4-66). The potential cumulative traffic impact of constructing more than one geothermal plant in the area at one time (p. 5-16) should be quantified and its significance assessed.

If you have questions or would like clarification on the CEC staff's comments, please contact Sharron Taylor of my staff at (916) 324-3231.

Sincerely,



ROBERT L. THERNELSEN, Chief
Siting and Environmental Division

cc: Office of Planning and Research

RLT:GW:st



Sierra Club

6 September 1967

130 Park Street
San Francisco
California 94109
115-776-2211

Mr. Daniel L. Lyster, Director
Energy Management Department
County of Mono
P.O. Box 8060
Harmoth Lakes, CA 95546

Dear Mr. Lyster:

I have been provided with a copy of the Draft Memo, Pacific Geothermal Development Project: Units II and III, Environmental Impact Report, Environmental Assessment to Review on behalf of the Sierra Club. Regrettably, the demands of my own work have prevented me from reviewing this document until the present moment. Your cover letter has stated that the comment period extends until forty-five days after receipt of the document. As I received the Draft EIR in England on July 26th, I trust that these comments will still be accepted.

In terms of scientific analysis and professional quality, the Draft EIR is considerably superior to other environmental documents that have been prepared for Mono County for geothermal project proposals. While it generally repeats a few general ideas (which an EIR should not reflect) it does draw a number of cautionary conclusions from the evidences and data upon which it is based. It concludes that too little is known about the hydro-thermal reservoir, or reservoirs, in the Casa Diablo-Hot Creek region to be able to predict the consequences for Hot Creek and the state fish hatchery if the proposed Harmoth Pacific project is to go forward (pages 2-4; 3-17, 19, 20; 4-12, 15; and 5-2). It acknowledges that if the thermal springs at Hot Creek were to be degraded as a result of project operations no mitigations are available for the loss of this "unique recreational resource" (pages 4-50 and 61). It states that the Forest Service policy and standards for visual quality retention and of the Mono County Scenic Element will be violated in the Casa Diablo area if Harmoth Pacific II and III are built (pages 3-42, 49; 4-44, 46; and 5-1). It recognizes the outstanding scenic quality of the area (page 2-4 and 3-45) and its high volume of recreational use (page 3-59). In its brief review of the cumulative impacts to be anticipated from the one presently operating and the five proposed geothermal power plants in the region, the report concludes that the overall and long-term impacts from their construction and operation could be significant with respect to water quality (page 5-6), pressure changes in the geothermal reservoir(s) (page 5-7), degradation of hot springs in the Hot Creek zone with consequent loss of its recreational value (page 5-15), the disturbance of deer migration (page 5-11), and in the creation of an unus-

trialized atmosphere in the region (page 5-14).

These basic findings reached in the DEIR raise serious questions about the justifiability of the proposed project. In exchange for a measure 24 kw of electricity produced for the relatively short period of thirty years, it would contribute to the at least moderate -- and perhaps disastrous -- degradation of one of the nation's two or three most heavily used, appreciated and needed mountain recreational playgrounds and, together with the other presently proposed geothermal project in Long Valley, would turn the energy producing area into an industrial park. Unfortunately, the DEIR ignores these fairly obvious conclusions to be drawn from its own findings and it justifies the project with gratuitous claims that all of the problems, except for the possible degradation of temperatures in Hot Creek and loss of visual quality, can be mitigated. The overly facile dismissal of the problems of stream pollution and noise, especially, should be remedied in the final EIR.

The Alternatives section of the report (Section 4.3) fails to meet the requirements of the California Environmental Quality Act, whereby a full discussion of reasonable alternatives must be provided (CEQA Guidelines, Section 15126(d)). The DEIR confines itself to a discussion of the "no project" alternative, and this only from the standpoint of financial loss if the project is not implemented.

Specific comments are as follows:

Pages 2-5 to 2-8 -- Further details are needed with regard to proposed well sites: terrain, cut slopes, quantities of soil to be removed, slope stabilization, proximity to wells.

Page 2-8 -- What are the locations of the abandoned wells and how are they to be resealed? What permitting process will be followed when and if these wells are proposed?

Page 2-21 -- Will the power plant site be paved as well as bermed to ensure retention of spilled fluids for proper disposal?

Page 2-22 -- Why is a different power plant location proposed for the Ormat alternative?

Page 3-11 -- A chemical analysis of Inyokern Creek tributary stream waters should be undertaken by the applicant so that baseline data can be provided.

Page 3-34 -- Complete botanical (and faunal) knowledge should have been obtained for the leasehold and included within this DEIR.

Page 4-4, top of page -- It is also necessary to design and build all facilities in such a way as to protect the natural environment.

Page 4-5, second bullet -- All disturbed areas should be stabilized at the latest by October 1st.

Page 4-8, third bullet -- All work performed between October 15th and at least should be completed in such a manner as to be completed in four hours. A winter storm can have come and gone in 48 hours.

Page 4-17, third line, third paragraph -- Disprint of "winter" for "water".

Page 4-34 -- It seems to be implied in the last paragraph that the previous disturbance of three acres of the power plant site somehow softens the impact of further vegetation loss. Furthermore, the case is editorially put in a minimizing fashion. Could it not also be put that "more than 12 acres of Jeffrey pine, more than six acres of sagebrush scrub . . . would be directly affected"? This instance is characteristic of the recurrent pro-project tone of the entire document.

Page 4-40, last paragraph -- How is it proposed that the maximum flow of Geothermal Fluid to reach Mammoth Creek could be reduced?

Page 4-42, first paragraph -- Grading for pads and access roads can alter the landscape form more than "slightly", depending on slope and layout.

Page 4-44, last bullet -- Exterior light should be directed inward and downward toward work areas, should be shielded so that no light shines outward nor upward, and should be equipped with operational switches so that light may be turned off when not needed.

Page 4-48, bullet at bottom of page -- In the interests of the reduction of housing needs construction activity should also be timed so as not to coincide with Mammoth/Chance construction nor PLS construction if these projects are implemented.

Pages 5-2 to 5-15 -- The discussion of cumulative impacts from the several Geothermal projects presently operating in the region for the area is much needed and is a good beginning. A more comprehensive study of cumulative impacts from all Geothermal projects together with others, such as the airport expansion project is urgently needed. The study needs to be free of a pro-development bias, under which the present brief discussion suffers, and should be undertaken by a consultant employed jointly by the County and the Federal Government and paid for by all project applicants in the Long Valley region proportionate to the costs of their projects.

Sincerely yours,

Hamilton Hess
Geothermal Coordinator
255 Ursuline Road
Santa Rosa, CA 95401

cc: Gil Davis, Chair, SO/SACC
Lisa Jaeger, Eastern Sierra Nevada T.F.
Julie McDonald, Esq., Sierra Club Legal Defense Fund, Inc.
Forest Supervisor, Inyo National Forest

Mammoth-Pacific

6055 Washington Boulevard
Suite 830
Commerce, CA 90040

213/725-1139

September 10, 1987

Mr. Daniel L. Lyster
Director,
Energy Management Department
MONO COUNTY
P. O. Box 8060
Mammoth Lakes, California 93546

Subject: Comments on draft Mammoth-Pacific Geothermal
Development Project: Units II and III Environmental
Impact Report/Environmental Assessment, July 1987

Dear Mr. Lyster:

As the proponent of the above-referenced proposed development, we hereby take this opportunity to provide additional project information; update and clarify information contained in the above-referenced Draft Environmental Impact Report ("DEIR"); and provide comments on the DEIR assessments and suggested mitigation measures.

<u>Reference</u>	<u>Comments</u>
Page 2-7, Figure 2-2	Well MP 12-32 is incorrectly identified in the figure as MP 12-52.
Page 2-23, Figure 2-7	Well MP 12-32 is incorrectly identified in the figure as MP 12-52. The production pipeline extending from the proposed site to the alternative site is not shown on the figure; however, it would parallel the existing plant injection pipeline route to the MP II & III alternate sites.
Page 3-17, Par. 4	Reference is made to our considering a proposal to greatly improve the quality of such data. Mammoth-Pacific is currently nearing completion of a comprehensive program to enhance and upgrade the geothermal resource monitoring instrumentation of the

operating Mammoth-Pacific geothermal power plant in order to provide highly accurate and continuous reservoir data, including capillary tubes which are being installed to provide downhole pressure measurement with an accuracy of ± 0.1 psi. Additional instrumentation will provide the following data: Produced fluid temperature at each well (± 0.2 °F); Injected fluid temperature at each well (± 1.0 psi); and injected fluid pressure at each well (± 1.0 psi). All data will be transmitted to an onsite computer for processing. The upgraded reservoir monitoring and data acquisition system should be completely operational by October 1, 1987. It is our intention to provide similar instrumentation for MP-II, MP-III, and the Long Valley Hydrological Advisory Committee ("LVHAV", formerly Long Valley Technical Advisory Committee) monitoring well which will greatly improve the degree of accuracy and overall quality of reservoir data obtained from power plant operations at Casa Diablo.

Page 3-21, Par. 3

Silencers have been re-installed on the expander exhausts of the operating plant, resulting in a greatly reduced noise level from the plant. The current noise level recorded at 0.5 mile distance is approximately 40 dBA. The noise level adjacent to the plant along Hot Springs Road (old Highway 395) has been reduced from an average of approximately 80 dBA without the silencers to 69 dBA with silencers and other noise reduction equipment installed on both units.

Page 3-40, Par. 2

A report titled Biological Assessment of Proposed Geothermal Energy Development in Casa Diablo Hot Springs Area on the Owens Tui Chub (*Gila bicolor snyderi*) and Hot Creek Headsprings Refugia, August 1987, has been submitted for review by the U. S. Fish and Wildlife Service in conformance with Section 7 of the Endangered Species Act. The submitted report can be fairly and succinctly summarized by stating that the proposed development will have no significant impact on the Tui Chub.

Page 4-27, Par. 2

The assessment of hydrogen sulfide emissions during well testing operations assumes the well will be pumped during the short-term (2-4 hour) well cleanout period. This assumption is incorrect and the 2,000 gpm pumped well flow rate overestimates the expected hydrogen sulfide emissions. The proposed operations would allow the wells to flow naturally without pumping (flow rate estimated not to exceed 500 gpm) to on-site tanks. This rate of flow would not result in emissions in excess of those allowable under GBUAPCD emission standards (2.5 kg per hour per well), as conservatively calculated below:

$$500 \text{ gpm} \times 3.785 \text{ l/gal} \times 8 \text{ mg/l} \times \\ \text{kg}/10^6 \text{ mg} \times 60 \text{ min/hr} = 0.9 \text{ kg/hr}$$

The 2,000 gpm flow rate refers to the estimated pumped flow rate of the wells during long-term flow testing. The long-term flow tests would be conducted in a closed system (page 2-29), and would, therefore, not release any hydrogen sulfide to the atmosphere.

Page 4-31, Par. 4

States isobutane is normally stored as a colorless, odorless, ... gas. However for the MP II & III project, it is proposed that an odorant would be added to the hydrocarbon working fluid, prior to storage and use.

Page 4-33, Par. 1

States vacuum truck would collect hydrocarbon vapor for potential reuse. Should state vacuum trucks would be used to collect non-vaporized hydrocarbon liquid for potential reuse or disposal.

Page 4-34, Par. 1

States relief valves and discharge valves would be opened to reduce the quantity of material available for combustion. Should state these valves would be closed to reduce ...

Page 4-34, Par. 2

States a mercaptan should be added to the isobutane as an odorizer. However, it has been demonstrated that mercaptans are not stable at the temperatures expected in the geothermal heat exchanger. As such, should state a temperature-stable odorizer, such as tetrahydrothiophene should be maintained in the system.

Page 4-19, Table 4-3

Mammoth-Pacific is actively participating in the LVHAC and has attended all organizational meetings, including the meeting of August 6, 1987, at which Mammoth-Pacific agreed to participate in the drilling of a monitoring well on the adjoining property. The location was acceptable to all the experts present. By being on the far edge of the established Casa Diablo geothermal reservoir, the monitoring well will provide very early warning of any significant changes taking place within the reservoir. At the same meeting, we supported the general area-wide monitoring program which was proposed by the members. We believe that such monitoring will provide important baseline data which will help greatly in the development of an area-wide model of geothermal resources and will enable permitting agencies to quickly identify changes that are taking place within the Long Valley Caldera.

Page 4-35, Par. 2

We have worked closely with a Subcommittee of the Owens Valley Interagency Council ("OVIAC") and representatives of Mono County on landscaping of the operating plant. We have always agreed with and continue to completely agree with, the need for landscaping, but believe that the following points should be acknowledged:

- A) The soil in the area is infertile with low moisture holding capacity which inhibits rapid plant growth in the relatively short growing season available.
- B) There are natural open areas where vegetation currently does not grow. These areas are especially hard to vegetate.
- C) The project area is geothermal in character and there are considerable portions of the area where the surface or sub-surface ground temperature is high enough to kill vegetation. It will not likely be possible to establish vegetation to grow in these already denuded areas.
- D) Fencing can be used in some, but not all, locations for effective screening of pipelines because of terrain.

There are a certain number of plants and trees that will necessarily have to be removed by reason of selection of the proposed alternate plant site. We propose, wherever feasible, to transplant existing trees to other locations including the existing plant site so as to improve the overall landscape. However, it should be noted that Jeffrey pines are difficult to transplant successfully, and it may be more practical to plant seedlings.

Page 4-37, Par. 1

States the pipeline from wells MP 12-32 and MP 12A-32 should be moved approximately 50 feet north to avoid the botanically sensitive area to the west of the proposed power plant site. However, the pipeline route proposed would actually follow the operating plant pipeline along an existing access road and would not impact the botanically sensitive area identified in the Draft EIR/EA. Further, moving the pipeline 50 feet north would increase the visibility of the pipeline along the bluff north of the existing MP Unit I power plant.

Page 4-38, Par. 4

The Draft EIR/EA suggests the applicant adopt costly mitigation measures for impacts on deer migration which are characterized in Appendix C to the document to be "trivial" even under a "worst case" scenario. Therefore, the mitigation measures appear unjustifiable.

Page 4-38, Par. 5

The Draft EIR/EA suggests the applicant consider acquisition of mule deer winter range habitat as a mitigation measure. This appears unjustifiable because: (1) the project does not specifically impact mule deer winter range habitat; and (2) the project is not expected to significantly impact mule deer.

Page 4-46, Par. 2

Based on further review, we agree with the recommendation of others to relocate the proposed plants about 400 feet east (alternate power plant site) of the initially proposed site in order to take advantage of the screening effect which would be provided by existing mature trees. We have also decided to reduce the visual impact of the existing plant by putting redwood slats in

all of the chain link fence around the plant as well as all existing and proposed well sites that would be visible from public roads in the area.

Page 4-52

It is suggested that the proposed plants, MP-II and MP-III, will generate costs that are greater than the funds that will be received by the county and special fees should be charged to cover costs for services provided. On Page 3-54, Section 3.3.2.4. County Fiscal Considerations, it is noted that the County receives 20% of the geothermal lease and royalty revenues from federal lands within its borders. In the economic impact section (page 4-51), no mention is made of funds the county will receive from the geothermal wellfield located on Federal Lease Number CA-1667A which will supply MP-III. It is estimated that MP-III would generate about \$100,000 in Federal County of Origin funds during the first full year of operation for the County. The adjoining PLES-I development on Federal Lease Number CA-11667 would also generate about \$95,000 for the County in County of Origin funds. Annual property taxes on the MP-II and MP-III are estimated at \$300,000 per plant, plus taxes from MP-I and PLES-I are estimated at \$300,000. Therefore, the proposed plants at Casa Diablo would provide over \$1.3 million annually in revenue to the County. Given these funds, the total development at Casa Diablo could generate approximately 10% of the County's operating income. Using the County labor force figure of 5,559 as shown on page 3-52, less than 1% of the County's labor force (i.e., less than 56 people) would be employed at Casa Diablo. On this basis, it appears that the proposed projects would be paying ten times its proportional share based on employment. On an income-revenue basis, these proposed plants appear to be very advantageous to the County.

Page 5-10, Par. 3

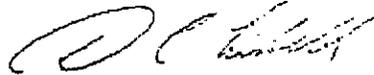
The analysis for cumulative impacts from fugitive emissions of hydrocarbons (see Table 4-7) is overstated in that two of the six proposed power plants (Mammoth/Chance Units I and II) would be located at least two miles east of the Casa Diablo area and would

not perceptibly influence the maximum ground-level concentration of hydrocarbon resulting from fugitive emissions in the Casa Diablo area. As such, they should not be considered in the single source, PTPLU model, analysis.

In addition to the above comments, we have asked three highly qualified independent geothermal resource consultants with direct experience in the Long Valley Caldera to review the DEIR and Technical Appendix with regard to all matters relating to ground water hydrology, reservoir performance, and the agreed upon monitoring program that will be administered by the LVHAC. The summary opinions and comments of Cascadia-Pacific, Geothermex, and the Mesquite Group, are attached as exhibits to this letter. All of the experts agree that it is extremely unlikely that the proposed development will affect the Fish Hatchery or Hot Creek, and that the monitoring program developed by the LVHAC will detect any potential thermal reservoir changes well in advance of them becoming a significant problem to either the Fish Hatchery or Hot Creek.

Thank you for the opportunity to comment on the Draft Environmental Impact Report/Environmental Assessment for the MP-II and MP-III Project. Please feel free to contact our office if we can further clarify any aspect of the proposed project.

Sincerely,



Donald C. Liddell

DCL:rj
Enclosures

Cascadia Pacific Corporation

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Re: Comments in response to "Draft Joint Environmental Impact Report and Environmental Assessment" for MP II and MP III Geothermal Development Projects with Discussion of Specific Mitigation Measures.

Summary

1. Expansion of the geothermal energy development at Casa Diablo will require increases in fluid production and injection equal to 2-4 times the current use.
2. The performance of the existing producing wells at Casa Diablo coupled with available geologic information indicates that, the expansion of production/injection would have no effect on the Fish Hatchery or other features.
3. The proposed monitoring well located to the east of the project would provide an "early warning" of any potential temperature or flow disruption that could interfere with the Fish Hatchery or other features which would allow time for mitigating measures to be put in place.

Purpose and Scope

The purpose of this discussion is threefold: (1) To review the referenced EIR/EA and present comments on the content and adequacy of the hydrologic and geologic portions of the report particularly as it relates to the impact of expanded geothermal development at Casa Diablo on certain surface geothermal features, (2) To evaluate and comment on the impact mitigation measures proposed in the report, by the developer, and by the Long Valley Hydrologic Monitoring Program (LVHAC), and (3) To present the conclusions and recommendations of Cascadia Pacific Corporation regarding the report and proposed mitigation measures. The discussion is limited in scope to the information contained in the referenced report and in documents prepared by or for the LVHAC and does not present technical information from other sources except by reference. Finally, the discussion, comments, and conclusions presented herein are considered to apply to PLES I as well as both MP II and MP III.

Conclusions and Comments

The sections of the referenced report which deal, in general terms, with the hydrology, geology and related matters present a discussion of the possible impact of expanded geothermal

development at Casa Diablo on surface and sub-surface geothermal features in both the immediate area and at the other major features such as the Fish Hatchery and Hot Creek that are located 3 to 5 miles from the site of the project(s). In summary the report concludes that:

1. Expansion of the Casa Diablo development beyond the existing geothermal production and electric power generating facilities will require a substantial increase in fluid withdrawals from the geothermal reservoir(s) at Casa Diablo.
2. All produced fluid would have to be injected into sub-surface zones that are permeable and not in communication with the producing intervals.
3. The nature and extent of the reservoir are not yet clearly defined and at least two geologic models can be described and supported with existing data.
 - a. A Lateral Flow model which envisions direct communication of geothermal fluid flowing from Casa Diablo toward the Fish Hatchery, Hot Creek, and other features to the east.
 - b. A Fracture Flow model which proposes that geothermal fluid flows upward in faults and fractures which occur throughout the study area and that each fault/fracture system is independent of the others so that there is no direct communication between Casa Diablo and any other feature such as the Fish Hatchery.
4. Reservoir analysis employing a very basic model and several limiting assumptions and using the Lateral Flow concept indicates that (a) the pressure drawdown effects due to increased Casa Diablo production, which could eventually cause reductions in flow at other geothermal sites, can be expected to be minimal if all produced fluid is re-injected and (b) that injection of cooler waste water at Casa Diablo will not produce either thermal or water quality interference at the Fish Hatchery or Hot Creek for at least 50 to 100 years, if ever.
5. If the Lateral Flow model is correct early warning of pressure/temperature reductions due to production at Casa Diablo could be obtained by the maintenance of a fully instrumented monitor well located to the east of, but reasonably close to, the project area.

It is the conclusion of this firm that despite a generally simplistic approach to geology and reservoir characterization and

certain fundamental limits in the analysis, the EIR/EA Hydrology report presents a reasonable and generally correct assessment of the risks posed to other geothermal features by expanded development. Years of study, research, and field experience on the Casa Diablo area lead this firm to conclude that communication and potential detrimental effects are extremely unlikely and that such effects would require many years to become manifest. It is further concluded that the use of a monitoring well provides a reasonable "insurance policy" against detrimental communication by allowing changes in pressure and/or temperature caused by production and/or injection to be noted and monitored near the project site long before features to the east would be affected.

Finally, it has been the long held opinion of this firm based on extensive research and reservoir evaluation that there is no proximate connection between Casa Diablo and the major features such as the Fish Hatchery. Production and injection of geothermal fluids at Casa Diablo will have no effect on geothermal features located outside the project area.

DISCUSSION

A resolution of the concerns regarding possible pressure/temperature degradation at the Fish Hatchery, Hot Creek and other sites due to geothermal production and/or injection at Casa Diablo depends, to a large extent, on the choice of a geologic/reservoir model for Casa Diablo. The large body of geologic, geophysical, and reservoir engineering analysis indicates that the Lateral Flow model is not correct and that the Fault/Fracture Flow model applies to Casa Diablo as it does to most geothermal systems. This model was developed by Cascadia Pacific in 1980-81 and has been reinforced and substantiated by subsequent development, well testing, and production at Casa Diablo.

In the Fault/Fracture flow model geothermal fluid flows upward from deep in the caldera through one or more near vertical faults which occur on or near the project site and which (may) penetrate the surface. Over time the seismic activity along the faults helps to create and maintain open (permeable) fractured zones in the hard, brittle rocks that occur at depth in the Casa Diablo area. These fractured zones are of limited aerial extent and provide very little fluid storage. Wells drilled into the fracture zones and/or faults (such as the existing MBP wells) can produce large volumes of high temperature fluids with virtually no pressure drawdown because they are recharged by fluid flow from very large hot fluid sources much deeper in the caldera.

Because of the fluid flow along faults and the limited extent of the fractured zone "reservoirs" there is virtually no communication between one surface site and another. The only connection is through the deep reservoir(s) that feed the fault

flow systems. Since total production is very small compared to the recharged reservoir volume, any pressure/temperature effects upon the source reservoir are insignificant and consequently are not transmitted to other near surface features.

If this model is correct, and the production history of the MBP wells indicate that it is, then development of Casa Diablo will have no adverse effect on any other feature.

If the Fault/Fracture Flow model is partially or wholly incorrect, which is contrary to geologic evidence and well test/production data, and the Lateral Flow model is found to apply, the reservoir analysis presented in the report indicates that pressure/temperature interference between Casa Diablo, the Fish Hatchery and/or Hot Creek would require 100-150 years under the worst case. Other assumptions could shorten or lengthen the time required but the analysis reasonably supports the premise that the project would have to run for 3-5 times the planned economic life before interference would occur. In any event, the proposed monitor well is a correct and responsible means to control the interference risk and allow sufficient warning so that further mitigating measures can be taken to prevent adverse interference. While any pressure/temperature degradation will be noted first in the project wells the monitor well will signal the expansion of degradation effects beyond the project area and will do so long before such effects could reach other features.

It is this firm's conclusion that the monitor well will be unnecessary but is a reasonably priced "insurance policy." Of course, no system of monitor wells or other measures will be able to anticipate the natural degradation of flow or temperature at the Fish Hatchery or Hot Creek.

CASCADIA PACIFIC CORPORATION



Richard J. Miller
President

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DISCUSSION AND COMMENTS

The Long Valley thermal system is of great interest both scientifically and economically, and has received increasing study by industry and public agencies in recent years. However, the size of the thermal system, its main centers of upwelling and outflow, and the amount and direction of thermal flow in the subsurface are still uncertain, despite this recent interest. The available evidence is ambiguous, and in some cases is contradictory. There is a general agreement that a system of monitoring should be instituted, to help resolve some or all of these uncertainties.

A comprehensive basinwide monitoring program probably would include meteorological data collection, stream gauging, and calculation of a basinwide water balance, as well as measurement of temperature, flow rate and chemical parameters in selected thermal and cool springs, plus the collection of these same parameters along with pressure data from geothermal and cool-water wells. Numerical simulation of the hydrologic system and the geothermal aquifers would be necessary. Such a program might require two or three years of data collection and analysis before comprehensive answers would become available.

However, much of the interest in the Long Valley thermal system is focused on the area extending from Casa Diablo to the Hot Creek Gorge. Because of this, it is possible to design a monitoring program that focuses directly on the issues specific to that region. One specific question, with two conditional corollary issues, would be addressed by such a monitoring program: Is there a direct hydrological connection between the Casa Diablo thermal area and springs supplying

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September 8, 1987

Mr. Michael A. Clinton
Director and General Manager
- Geothermal
Pacific Lighting Energy Systems
6055 East Washington Boulevard
Commerce, CA 90040

Dear Mr. Clinton:

COMMENTS IN RESPONSE TO THE DRAFT ENVIRONMENTAL
IMPACT REPORTS ON MAMMOTH PACIFIC UNITS II AND III

JAMES B. KOENIG,
PRESIDENT, GEOTHERMEX, INC.

SUMMARY STATEMENT

Numerical analysis of well-production data by GeothermEx, Inc. in 1986 showed no discernible pressure drawdown in the thermal aquifer supplying the Mammoth Pacific I power plant. Before any pressure or temperature effect would be observed at the Fish Hatchery or at Hot Creek Gorge pressure drawdown would be experienced at the Casa Diablo wells. The analysis of temperature-gradient and geochemical data also performed by GeothermEx in support of the production data analysis suggests that the power plant capacity can be expanded as proposed by Mammoth Pacific. Monitoring of pressure trends is recommended, supported by suitable data analysis.

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both the Fish Hatchery and the Hot Creek Gorge? As a first conditional corollary to this question, if there is a direct hydrological connection, how much withdrawal of thermal water can be sustained without there being noticeable effects at the Fish Hatchery and Hot Creek Gorge? As a second conditional corollary, if effects of production become noticeable over time at the Fish Hatchery and/or the Hot Creek Gorge, what actions can be taken to mitigate such effects without curtailing the commercial production of geothermal energy?

GeothermEx has performed the only numerical analysis of all production data for wells presently supplying Mammoth Pacific power plant 1. This analysis, completed in mid-1986, showed that at the current rate of production there is no discernable pressure drawdown in the aquifer supplying the power plant. It appears to be possible to expand the capacity of the power plant significantly without causing measurable drawdown at the Casa Diablo site. Therefore, even if there is direct communication between the Casa Diablo thermal aquifer and the springs supplying the Fish Hatchery or Hot Creek Gorge, there is no evidence that pressure drawdown would be experienced at the Fish Hatchery. Indeed, based on highly idealized models of the hydrologic system performed as part of the Draft Environmental Impact Report on Mammoth Pacific #II and #III prepared for the County of Mono, it was concluded that despite the relative lack of data it was unlikely that there would be any pressure or temperature effect at the Fish Hatchery as a result of additional production at Casa Diablo.

With regard to temperature effects at the Fish Hatchery springs, it has been postulated that a drop of as much as 2° to 3°F might ultimately be the result if the thermal component of the spring

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water was cut off. There has been extensive speculation regarding the source of this thermal water component relative to the Casa Diablo thermal area. However, although nothing is proven regarding any possible connection between these areas at depth, there is one important conclusion regarding the possible temperature effects of further development of the geothermal resource at Casa Diablo by Mammoth Pacific: the geothermal fluid is to be reinjected into the aquifer system from which it is withdrawn, and the temperature of injection (160°F) is significantly higher than the temperature of the Fish Hatchery springs (average about 55°F). Therefore, there is unlikely to be any marked temperature degradation of the Fish Hatchery springs unless there is both: (a) a direct hydrologic connection between the Fish Hatchery and Casa Diablo; and (b) a severe pressure decline over a period of years at Casa Diablo.

As mentioned above, GeothermEx's 1986 analysis of well-test data and matching of well-production data at Casa Diablo indicates that the commercial generation of electric power can be expanded significantly with no pressure drawdown effect at Casa Diablo. This finding tends to obviate the question of hydrologic connection at depth between the two areas.

It is recognized that there will be a need for close monitoring of production wells and those wells to be drilled in connection with expansion of the Casa Diablo power project, in order to identify pressure trends with time as the project is expanded. Data from well tests and production monitoring can be analyzed most rigorously by numerical simulation monitoring, in which the results of mathematical simulation are matched with the entire production history. This

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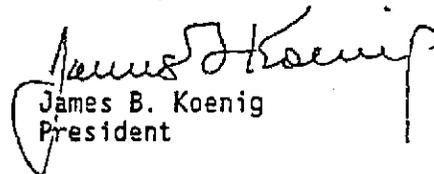
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matching allows the reservoir engineers to forecast future well behavior, including any pressure or temperature declines, with a degree of confidence not attainable otherwise.

Work done in 1985 and 1986 by GeothermEx, including an analysis of temperature distributions in the subsurface, and a comprehensive assessment of the chemistry and isotopy of cool and thermal waters of Long Valley, has suggested the following: there is a general flow of thermal waters from W to E or SW to NE in the Casa Diablo area; there are multiple subsurface flow paths for the thermal waters; there have been varying degrees of mixing with cool waters, along with conductive cooling and degassing en route to surface discharge points; and the parent source water has not yet been identified by drilling. Given this picture, plus the results of GeothermEx's 1986 analysis of production data at Casa Diablo, it appears very reasonable to allow continued development of geothermal power at Casa Diablo.

Sincerely,


James B. Koenig
President

JBK:mjm

Mesquite Group, Inc.

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Comments Regarding the Draft Environmental Impact Report Mammoth-Pacific Geothermal Development Project: Units II and III

(July 1987, for the County of Mono
by ESA and Berkeley Group, Inc.)

Summary

Pursuant to the request of Mammoth-Pacific, Mesquite Group, Inc. (Mesquite) has reviewed the July 1987 Draft Environmental Impact Report (DEIR) concerning the proposed Mammoth-Pacific Geothermal Development Project: Units II and III. While there are some minor differences of opinion, Mesquite believes the overall document to be adequate. Additional discussion appears to be warranted, however, with respect to four aspects of the Project. Mesquite's comments in this regard may be summarized as follows:

1. The "upwelling/fracture" model for the Long Valley hydrothermal systems better fits the known geology, temperature and chemistry data than does the historically accepted "lateral flow" model. As a consequence, Mesquite believes that there is no shallow lateral connection between the Casa Diablo geothermal reservoir and the hydrothermal systems at the Hot Creek Fish Hatchery and Hot Creek Gorge.
2. Even if a shallow lateral flow connection is assumed to exist, Berkeley Group's numerical modeling indicates that the impact of Casa Diablo development on the fish hatchery and Hot Creek thermal springs would be negligible or non-existent. In the extreme case of significant pressure, temperature, or chemistry changes in the Casa Diablo reservoir, corrective action in terms of revised well field management would likely be required long before such changes could propagate as far as the fish hatchery.
3. Subsequent to the DEIR writing, Mammoth-Pacific committed during discussion with the Long Valley Hydrologic Advisory Committee to drill an observation well between Casa Diablo and the fish hatchery. This well is intended to penetrate the geothermal reservoir and provide very early warning of any changes propagating in the direction of the fish hatchery.
4. Existing MP I well monitoring instrumentation is currently being upgraded. The DEIR states that the original MP I instrumentation was inadequate for detecting subtle changes in pressure, temperature and rate during the first two years of operations. While Mesquite believes it is clear that there have been no changes, Mammoth-Pacific is proceeding with upgrading the instrumentation in order to eliminate any future uncertainty.

Introduction

The comments below regarding the Draft Environment Impact Report (DEIR) for the Mammoth-Pacific II and III Geothermal Project were prepared by Mesquite Group, Inc. (Mesquite) in response to Mammoth-Pacific's request. The main purpose of these comments is to more fully present and document Mesquite's concept of the "upwelling/fracture" model for the Long Valley hydrothermal systems and contrast it to the historically accepted shallow "lateral flow" model.

It is important that the distinction between the models and their respective supporting data bases be understood. The upwelling/fracture model essentially precludes a shallow connection between the Casa Diablo Geothermal System and the surface thermal features of concern to the east (i.e., the Hot Creek Fish Hatchery warm springs and the thermal springs in Hot Creek Gorge). The lateral flow model, on the other hand, postulates possible interference with these surface thermal features due to the proposed expanded geothermal development. While Mesquite does not believe a shallow connection between the areas exists, additional comments are also offered concerning the minimal impacts believed likely, even if such a connection were to exist via shallow lateral flow.

An additional area deserving of more discussion concerns the data monitoring program and planned observation well agreed to in principle with the Long Valley Hydrologic Advisory Committee (LVHAC) subsequent to the draft EIR issuance. Mammoth-Pacific (MP) supports the caldera wide data gathering program proposed by the LVHAC, as much of the current uncertainty and concern is believed to stem from a lack of accurate historical data. In addition to monetary support for the overall monitoring program, Mammoth-Pacific has committed to an extensive upgrading of the current data gathering system for the existing MP I operation and, most importantly, a new observation well located between Casa Diablo and the fish hatchery.

Long Valley Hydrothermal System Models

The hydrology section of the EIR discusses two models of the Long Valley Hydrothermal System. One of these, the "lateral flow" model, postulates that hot water rises in the western portion of the Long Valley Caldera and flows within a confining aquifer eastward to Lake Crowley to form one continuous thermal system. The second model, the "upwelling/fracture" model, proposes that thermal fluids rise along open fractures that accompany the major north-northwest trending faults, with separate thermal systems existing within each of the three southern Long Valley grabens (i.e., down-dropped fault blocks).

Lateral Flow Model

The continuous lateral flow model, which was originally proposed in the mid-1970's (Lachenbruch et al, 1976), is based primarily on the widespread occurrence in a number of wells of a similar shallow high temperature zone underlain by cooler

temperatures. A common thermal parent located in the western portion of the caldera was believed to exist (Figure 1). Recently obtained temperature data from the Shady Rest Campground and Union 14-16 wells led Sorey (1987) to propose that the parent hot water upwells from the basement beneath the western moat rhyolite to the shallow thermal aquifers. The thermal waters then migrate in a western direction towards the Union 14-16 well and in a southeast direction towards the Shady Rest area and the Casa Diablo Geothermal Field. While flowing eastward, the parent waters cool by boiling, conduction and mixing with fresh, cold ground waters (Shevenell et al. 1987), emerging in the Hot Creek Fish Hatchery area and at Hot Creek Gorge. The waters cool additionally on their continued eastward migration towards Lake Crowley.

A geologic cross section depicting this model is provided in Figure 2. It has been modified from Sorey et al. (1984) by including the recently acquired thermal data from the Union 44-16 and Shady Rest wells. In this model, meteoric waters provide cold water recharge to the system by flowing down the ring faults around the edge of the caldera to the deep, hot basement rock. The parent thermal water ($\pm 420^{\circ}\text{F}$) then upwells from the basement along a separate fault system beneath the western moat rhyolite. A limited portion of this water flows westward towards the Union 44-16 well at two different depths. Upon reaching the shallow aquifer, defined roughly as the rocks within a few hundred to 1000 feet of the surface, the water migrates eastward and cools to $\pm 400^{\circ}\text{F}$ at Shady Rest. Between Shady Rest and Casa Diablo, the thermal fluids pass through a major fault and rise again approximately 500 feet while cooling $\pm 50^{\circ}\text{F}$ to a resource temperature of $\pm 350^{\circ}\text{F}$. From the Casa Diablo area, the hot water flows eastward across two additional major faults, cooling to $\pm 270^{\circ}\text{F}$ in the fish hatchery area. As the flow continues to the east, the water cools to approximately 200°F at Hot Creek Gorge and 160°F near Lake Crowley. Sorey (1985) suggested that a separate thermal system exists in the eastern portion of the Long Valley Caldera. Water from this separate system rises in the vicinity of Lake Crowley and mixes with the thermal waters of the main Long Valley thermal system.

Upwelling/Fracture Model

Geologists and engineers from Mesquite began reviewing the large amount of detailed data available from Casa Diablo in early 1986. Instead of having to relate data from wells and springs miles apart, the seventeen wells at Casa Diablo are within a few hundred feet of each other, and they present a unique opportunity for detailed study. Initially, the lateral flow model was accepted by Mesquite as a basis for development planning. However, close examination of the Casa Diablo data revealed numerous features that did not fit the lateral flow concept. In addition, recently released data from the Chance Meadow/fish hatchery area also appears to be difficult to reconcile with the lateral flow model. A review of the complete Long Valley chemical data base further highlighted problems with the model.

Casa Diablo Data

The seventeen geothermal wells and two deep temperature observation wells at Casa Diablo range in depth from a few hundred feet to 5265 feet. Lithologic (i.e., rock cutting) logs, electric logs, drilling histories, and pressure and temperature surveys combined with geologic mapping (Bailey, 1974) indicate that the Casa Diablo Geothermal System occurs in the eastern part of a large graben bounded by two major normal faults and cut by at least four interior faults. One of these interior faults is the active Taylor/Bryant Fault, movement of which during the 1980 earthquake caused significant ground breakage and surface displacement. This and similar movements in the past are believed to have fractured the competent rocks in the vicinity of these faults. The degree of fracture concentration appears to be highest near and between closely spaced faults, decreasing with distance away from the faults. Only the hard, brittle, competent rhyolite lavas appear to be able to maintain open fractures.

Several geothermal development geologic maps similar to the Maximum Observed Temperature Map shown in Figure 3 have been constructed by Mesquite. All of these maps show that the Casa Diablo Thermal System trends north-northwest and is bounded by faults on both the west and east. A lobe of maximum temperature lies along and to the east of the Taylor/Bryant Fault. This maximum temperature lobe is open to the south, but quickly cools to less than 300°F in the north. The MBP-5, Endogenous #2 and Endogenous #3 wells indicate that temperature dissipates rapidly to the west of the Taylor/Bryant Fault. In the eastern part of the field, maximum temperatures decrease from 338°F to 304°F in a distance of 800 feet. A simple west to east flow of thermal water cannot be accommodated with such a temperature distribution.

The cross section of Casa Diablo (Figure 4) further illustrates the complexity of the thermal system with depth. The nine wells along the section indicate that the thermal reservoir is concentrated to the east of the Taylor/Bryant Fault and disappears rapidly to the west of the fault. East of the main production area, the reservoir thins to less than 100 feet in the vicinity of the Union Mammoth #1 well and then drops 400 feet and thickens near well IW#2. Between wells IW#2 and IW#1, the "reservoir" drops an additional 1000 feet. East of well IW#1 at Magma Mammoth #1, the reservoir does not exist. Again such a complex temperature distribution does not lend itself to interpretation in terms of a simple west to east lateral flow.

The reservoir pressure and water chemistry in the Casa Diablo Field also varies somewhat between wells. Within the main production area, static pressures may be as much as 15 psi different at a given datum between wells. The chemical concentrations of boron in the thermal water ranges from 7.8 to 11 mg/l, while the sodium values vary from 340 to 382 mg/l. These variable pressure and chemical data are further indications of a complex system, even within the limited Casa Diablo area.

Mesquite now believes that the distribution of fault associated, open fractures controls the Casa Diablo Geothermal Resource, as depicted in the schematic cross section (Figure 5).

These open fractures are concentrated along and between faults and do not occur everywhere, as would be required in a continuous lateral flow model. The thermal fluids appear to rise along the Taylor/Bryant Fault system and along the Eastern Casa Diablo Graben boundary fault system. Upon reaching an interval of hard, competent, highly silicified rhyolite rock which maintains open fractures, the thermal fluids migrate away from the upward transmitting faults. Between the Taylor/Bryant Fault and an unnamed fault immediately east, the fractures are highly concentrated and this constitutes the main production area. West of the Taylor/Bryant fault the fractures dissipate quickly. East of the main production reservoir, fractures dissipate and then again concentrate along the Eastern Graben Boundary Fault at a greater depth.

Regional Data

The disagreements between observed data in the Casa Diablo area and the lateral flow concept led Mesquite to review other Long Valley data for consistency with the two different models. Geologic, geochemical, and thermal data were examined in detail. Several additional features were apparent that did not conform to a simple lateral flow system. For example:

1. Structural and stratigraphic interruptions in the fluid flow paths - The Hot Creek Fish Hatchery is located within a separate graben to the east of the Casa Diablo Graben. The hot springs located on Hot Creek and Little Hot Creek, along with the Whitmore Hot Springs, occur in still a third graben situated on the eastern flank of the resurgent dome. Unnamed horsts (elevated fault blocks) are located between these three grabens. The relative vertical movements along these normal faults separating these structural blocks displaces and make discontinuous any horizontal stratigraphic units, as illustrated schematically on Figure 6. Thus, if a common shallow thermal aquifer were to exist, the thermal waters would have to rise and fall as they crossed these multiple faults, some of which have displacements of exceeding 400 feet. Yet one of the main evidences for a regional aquifer cited by Sorey et al (1978), is a nearly flat water table. The detailed geologic structure of the area indicates that any such "flat" and continuous water table is illusionary and that a multiple, segregated thermal aquifer with an independent reservoir located in each graben is more likely. This is also consistent with the observation that the thermal features are always associated with the grabens and never the horsts, and certainly suggests that the shallow thermal zones are not continuous across the horsts.

The shallow geothermal reservoirs in the Casa Diablo and Chance Meadow areas are situated within rhyolite lavas. These crystalline rocks have very low natural permeability (i.e., ability to flow fluids). In addition, the reservoir rocks at Casa Diablo have been highly silicified, reducing their matrix permeability to essentially zero. However, drilling cuttings from Casa Diablo exhibit quartz/pyrite veins, euhedral quartz crystals, and quartz-cemented breccia

zones which clearly indicate the presence of open fractures. For such fracture permeability to continue uninterrupted across the entire caldera, a distance of ten miles, in a nearly flat horizon is inconceivable in the context of the caldera's geology.

As shown on Figure 7, thermal manifestations occur mostly along the numerous known faults in the caldera and are not at all continuous across it. These faults and their associated fractures allow thermal waters to accumulate in shallow reservoirs. Such structural control is clearly illustrated in Figure 7 where active and fossil hot springs along with hydrothermally altered ground generally occur only in alignment along the faults. The lack of thermal features between the faults suggests that a continuous thermal aquifer is not located throughout the caldera.

2. Thermal water chemistry inconsistencies - Analyses of Casa Diablo geothermal waters are listed in the table below. Also shown are chemical analyses of fluids from the Mammoth/Chance #2 geothermal well and a fresh, cold ground water (Laurel Spring). The concentration of individual ions at Casa Diablo is generally higher than that in Chance #2. Sorey (1984) models this chemical difference as being due to dilution of Casa Diablo type thermal water by a Laurel Spring type ground water. The average mixing percentage of Casa Diablo type water required to form Chance #2 type water by dilution with Laurel Spring water is about 82 percent.

CHEMICAL ANALYSES TABLE
LONG VALLEY GEOTHERMAL AND GROUND WATERS
MONO COUNTY, CALIFORNIA
(Unflushed Samples)

Parameter (mg/l)	MBP-1*	MBP-3*	MBP-4*	MBP-5*	35-32**	Chance 2*	Laurel Spring *
TDS	1392	1376	1381	1382	1553	1060	193
SiO ₂	234	255	240	240	275	140	60
Ca	3.1	1.3	1.8	6	6.1	1.4	5.3
Mg	.13	.12	.1	.1	<1	.1	6.6
Na	382	350	340	340	382	290	24
K	35	36	35	31	29.6	20	4
HCO ₃	355	345	360	360	460.7	290	81
SO ₄	108	112	110	110	115	98	6.4
Cl ⁻	260	253	270	270	251	210	4.5
F	11	10.2	10.5	10.5	11.6	8.7	.5
B	11	10.7	11	11	7.9	9.1	.26
Li	2.7	2.6	2.6	2.7	2.6	2.1	.04

*Farrar, et al. 1986

**Masquita. 1986

Hydrogen and oxygen isotope ratios of many of the thermal and non-thermal waters in the caldera are plotted in Figure 8 (Farrar et al. 1985). Ground waters plot near the

meteoric water line, with fractionation causing isotopically heavier precipitation to fall west of Long Valley. Isotope values for the thermal waters plot to the right of the meteoric waterline. This relation results from water/rock reactions at elevated temperatures that preferentially exchange rock ^{18}O for water ^{16}O , without change in hydrogen isotope values because of the lack of hydrogen in the rocks. The hydrogen and oxygen isotopes of Long Valley waters reflect four groupings. The heavier isotope group contains Casa Diablo samples. The second heaviest isotope group corresponds to Hot Creek waters. The third heaviest group originates from Little Hot Creek waters. The lightest group is associated with eastern caldera hot springs. Other investigators have indicated that if the parent geothermal water is mixed with a Laurel Spring type water, all of the observed Long Valley thermal water types can be produced. This proposed mixing would occur along the straight line drawn in Figure 8. For example, Spring H-II, III could be a mixture of Laurel Spring (LS) water and Hot Creek water (HC 1,2,3). Note, however, that Casa Diablo water (MBP-3 & MBP-1) and Little Hot Creek (LHC-F&T) do not occur on the mixing line and cannot be generated in the proposed way. Mesquite believes that lack of a common mixing line and the distinct grouping indicate that separate hydrothermal systems exist within each of these four areas and, most significantly, that each group has its own recharge area.

As noted above, dilution can explain the ionic chemistry of the Chance #2 type water. However, similarly accounting for the stable isotope values and the observed temperatures requires conflicting percentages of dilution. The hydrogen and oxygen isotope values shown in Figure 8 suggest that a mixture of 43 percent Casa Diablo well water (MBP-2 & 5) with 57 percent Laurel Spring water would be required to yield the observed stable isotope concentrations of Chance #2 water. Furthermore, the geothermal reservoir at Casa Diablo has a temperature of 350°F . At Mammoth/Chance, the reservoir has a subsurface temperature of 271°F . A mixture of 73 percent Casa Diablo water at 350°F with 27 percent water at 54°F (the temperature of Laurel Spring), yields the required temperature of 271°F . Thus, simple dilution does not explain the observed chemistries, and a common shallow aquifer model at Long Valley does not appear to be supported by the collective consideration of the ionic chemistry, temperature and stable isotope values. The basic similarity in the ionic chemistry of Casa Diablo and other thermal waters in the caldera may simply be representative of similar recharge waters and reservoir lithology. In fact, it would be surprising if all thermal waters in the caldera were not similar given the presence of limited number of rock types and a common meteoric recharge source.

3. Temperature complexity - Similar temperature profiles in many of the wells showing a shallow thermal zone underlain by lower temperatures have been utilized as evidence of single aquifer transmitting hot water laterally from Casa Diablo eastward to Lake Crowley. Figure 9 shows such a

temperature profile from Union Mammoth 1, the deepest well at Casa Diablo. Recent closely spaced drilling in the Chance Meadow area has revealed that, as at Casa Diablo, a continuous, lateral flow aquifer does not appear to exist here either. The Chance #1 well intersects a 271°F geothermal reservoir at approximately 250 feet below the surface. An observation well (M-2) located 650 feet south of Chance #1 measured only 130°F at 250 feet. Well M-5 situated 800 feet southeast of Chance #1 recorded only 140°F at 325 feet. While half way between Chance #1 and Hot Creek Gorge (±200°F), observation Well M-4 has a maximum temperature of only 125°F at a depth of 480 feet. A continuous lateral flow aquifer should have yielded similar temperatures at the comparable depths in these wells.

The complexity of the regional temperature/depth relationship within the caldera is illustrated in Figure 10. In this west to east thermal cross section, the depth to the 100, 200 and 300°F temperatures has been plotted in eleven wells and contoured. These temperature contours rise and fall as the caldera is traversed. A continuous, lateral flow would have flat or nearly horizontal temperature contours. The oscillating thermal contours suggest again that separate thermal systems are segregated by cool areas without active shallow thermal reservoirs.

In summary, Mesquite believes the data discussed above best fit an upwelling/fracture model that has several, possibly four, isolated shallow geothermal systems situated adjacent to the major Long Valley fault systems. As shown on the geologic cross section (Figure 11), cold recharge water from different locations outside the caldera migrates downward along the caldera's ring faults into the basement. In the basement, the water is heated conductively from a magma located beneath the western portion of the caldera. The maximum temperature the waters obtain is a function of their distance from the magma. Clearly, waters of the Casa Diablo system are nearer the magma than are waters of the Chance Meadow/fish hatchery area and Hot Spring Gorge systems. The heated waters upwell towards the surface along the major faults that intersect basement rocks. These hot fluids may then migrate short horizontal distances away from the faults where fractures in competent rocks occur. Note that this depiction has many features in common with the lateral flow cross section discussed initially (Figure 2). The main difference being that the thermal waters upwell in several separate systems rather than a single one in the west. In the eastern portion of Long Valley between Hot Creek and Lake Crowley, Mesquite does recognize that a shallow aquifer is transmitting thermal waters laterally. In this area a thick section of lacustrine sediments occurs which has the type of porosity and permeability that allow a regional aquifer to exist.

Minimal Impact Potential

Berkeley Group, Inc. (BGI) presented several numerical modeling results in the DEIR which attempted to quantify the potential effects of Casa Diablo geothermal development on the surface thermal features of concern. While admittedly based on

simplistic models. the results are illustrative of the magnitude of potential impacts if these areas are truly connected. Even in the worst case, the predicted pressure changes were only increases of a few psi (relative to ± 200 psi currently at the top of the Casa Diablo reservoir). An increase in pressure could theoretically increase the thermal water flow rate at the fish hatchery or Hot Creek, but such a relatively small change is likely that it would almost certainly be masked by the natural variations known to occur. BGI's separate numerical modeling of the cold temperature front movement away from the injection point at Casa Diablo ($\pm 160^\circ\text{F}$ plant reject water) indicated that even in the worst case, more than 100 years would be required for the slightest cooling to reach as far as the fish hatchery.

It should be further emphasized that for any significant change to propagate away from Casa Diablo, an even bigger change must be seen in the geothermal field itself. Thus far, after two years of MP I operations, no change in pressure, temperature or chemistry has been detected in the field. If a major change were to occur at some point in the future, it is quite likely that corrective adjustments in the management of the production/injection well field would be required before such changes propagated very far. Economic optimization requires that the resource supply the MP II and III plants consistently over their $30\pm$ year lifetimes. Significant deviations in the resource from design specifications are undesirable and would result in a strong economic incentive for corrective action as soon as possible.

Monitoring

Observation Well

Mesquite does not believe that geothermal operations at Casa Diablo will effect thermal springs at either the Hot Creek Fish Hatchery or Hot Creek Gorge. However, subject to receiving the required permits, Mammoth-Pacific has committed to drilling and monitoring an observation well located between the Casa Diablo development and the fish hatchery. The main purpose of this well will be to detect changes in reservoir pressure, temperature, and/or chemistry which might indicate propagation of such changes in the direction of the surface thermal springs at the fish hatchery and Hot Creek.

Mammoth-Pacific met with the rest of the LVHAC in early August and discussed the advantages and disadvantages of the sites available to drill a Casa Diablo observation well. The LVHAC recommended locating the well immediately south of the well field at the 65-32 site (Figure 12). It was recognized that this location, which is only 1700 feet east of the nearest production well and only 1400 feet south of the nearest injection well, would very quickly detect any changes in the Casa Diablo Reservoir. Such early warning would give Mammoth-Pacific ample opportunity to modify, as necessary, the production/injection well field operations in order to curtail any potentially detrimental changes propagating towards the fish hatchery. In addition, Colton Spring is located between the proposed observation well site and the fish hatchery. This spring provides an additional back-up observation point for confirming changes.

although its historical record of fluctuation makes it less reliable than the well.

It was also clearly recognized at the August LVHAC meeting that changes in the Casa Diablo reservoir detected by reservoir monitoring or the proposed observation well would not necessarily mean that there would be an interaction with the fish hatchery and Hot Creek thermal springs. If the upwelling/fracture model is correct, there is no connection and none of the detected changes would be propagated beyond the graben bounding fault to the east. If significant changes in the reservoir at Casa Diablo continue unabated, a second observation well east of the Casa Diablo graben, between Colton Springs and the fish hatchery, would probably be required. If this second well confirmed significant changes in a "connected" thermal aquifer, the LVHAC would probably recommend measures be undertaken by Mammoth-Pacific to mitigate such changes.

At this point Mesquite has designed and documented the detailed drilling, completion, testing, and monitoring programs for Observation Well 65-32 for Mammoth-Pacific. After LVHAC concurrence, the required permits to drill the well will be applied for. The well should be drilled and tested this fall, which would allow a full year of baseline data collection before the MP II plant begins operation.

As shown on Figure 12, the 65-32 well site is slightly north of the old 395 Highway, approximately 800 feet south of the old 395 and 203 Highway intersection. The well will be drilled to a maximum total depth of 1000 feet (Figure 13), with an option to stop at a shallower depth if, as expected, an active geothermal reservoir is penetrated. After installing casing and wellhead equipment, Mammoth-Pacific plans to flow test the well and collect samples of the thermal waters for chemical analyses. Following the flow test, the well will be instrumented with a temperature compensated quartz crystal pressure transducer that will transmit the reservoir pressure to an automatic recording computer. This instrumentation will allow continuous observation of reservoir pressure with an accuracy of ± 0.01 psi.

The currently proposed data collection program consists of reservoir pressure measurements continuously for one year before and one year after the start-up of the proposed expansion development and then monthly thereafter. Temperature profile surveys and flowing of the well for reservoir fluid chemistry samples will be performed immediately after drilling and then semi-annually. All the data collected from the observation well will be assembled quarterly and submitted to the LVHAC within one month following the end of each quarter.

Mesquite believes that the proposed monitoring program will safely guard the thermal springs at the fish hatchery and Hot Creek from any interference due to Casa Diablo geothermal development.

Mammoth-Pacific I Instrumentation Upgrading

The original well data gathering instrumentation for the

existing MP I operations is currently being supplemented and upgraded. While the original instrumentation was adequate for most field management purposes, the present desire to detect very small changes in pressure and temperature requires enhanced capabilities.

The new pressure monitoring instrumentation for the production wells is essentially the same as that described for the observation well, i.e., continuous recording with a quartz crystal pressure transducer attached to a downhole capillary tube filled with Nitrogen. Wellhead pressures on the injectors will be measured and recorded three times each day using a manual, plug-in type pressure transducer with an accuracy of ± 1.0 psi.

Rates (producers and injectors) will likewise be recorded manually three times each day using a manual, plug-in type pressure transducer to measure the pressure differential across an orifice meter (accuracy ± 5 percent). A plug-in type RTD will be used similarly to measure wellhead temperatures (accuracy $\pm 1.0^{\circ}$ F). Samples for chemical analysis will be taken from each production well on a semi-annual basis.

This upgrading effort should be completed by October 1, 1987, in time for a full year of data before MP II and PLES I are started up. Eventually the entire data gathering system, except for chemical sampling, will be fully automated for all the Casa Diablo wells. Such a comprehensive system will provide good quality data for detection of even small changes in resource character long before they become problems.

Don A. Campbell

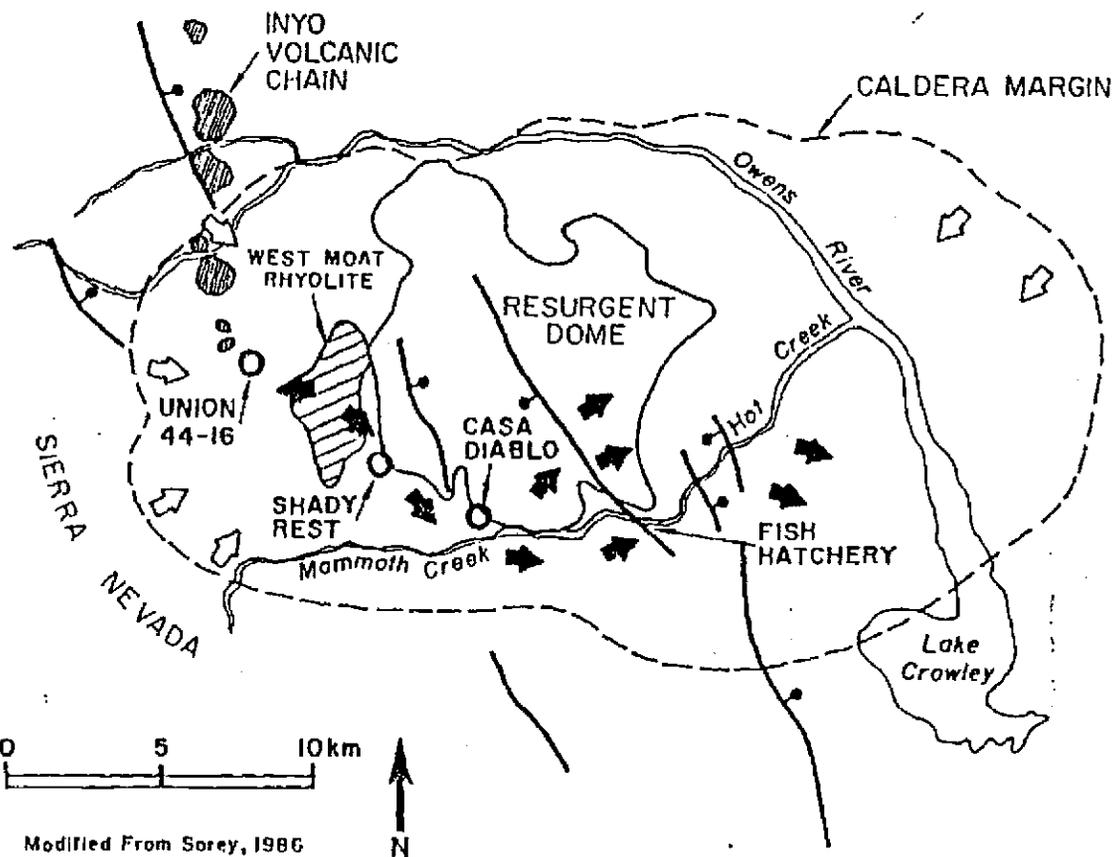
Don A. Campbell
President
Mesquite Group, Inc.
September 8, 1987

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FIGURE 1

REGIONAL HYDROTHERMAL FEATURES MAP
LONG VALLEY CALDERA



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Modified From Sorey, 1986

FIGURE 2

LATERAL FLOW MODEL GEOLOGICAL CROSS SECTION

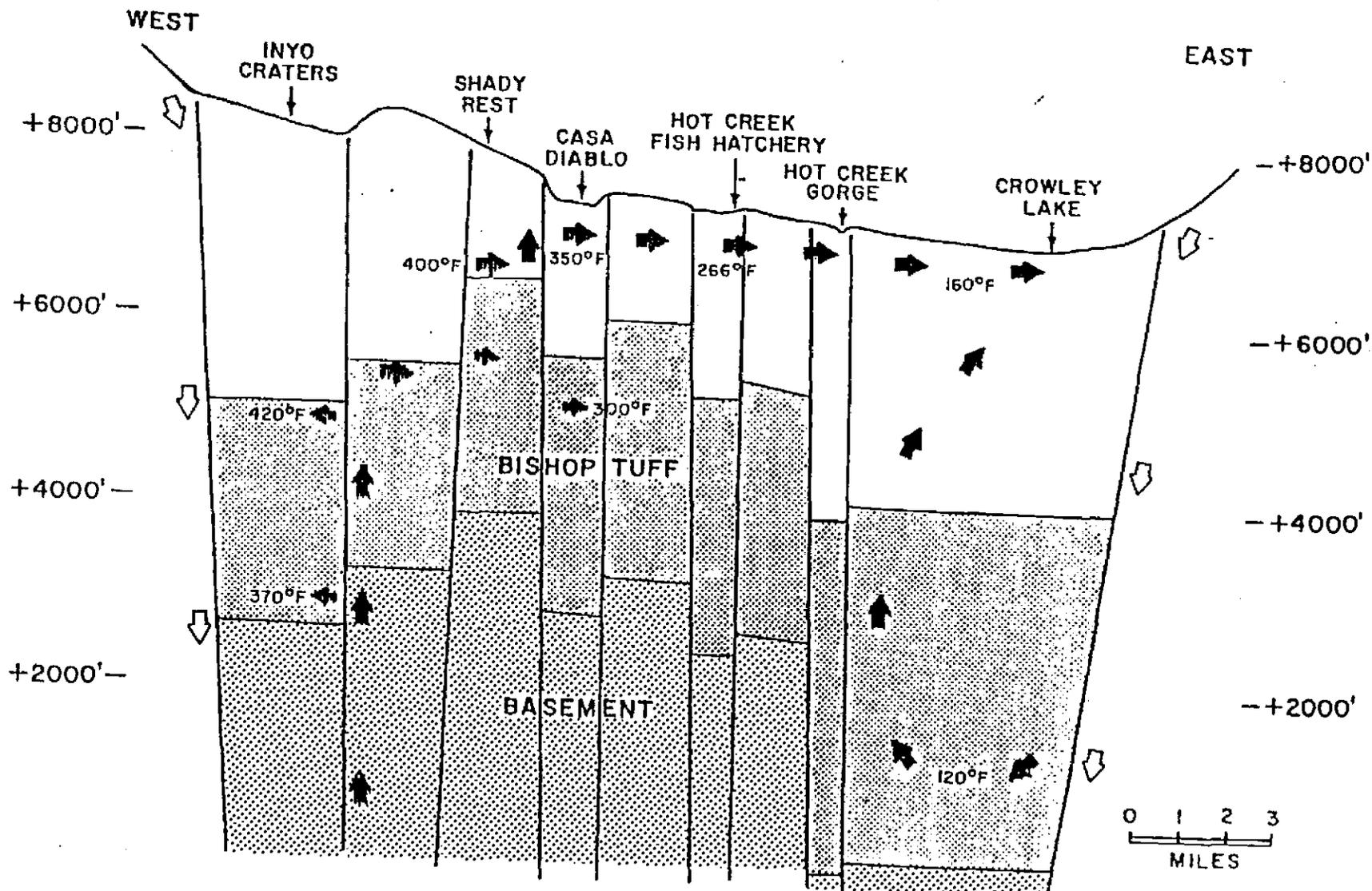


FIGURE 3

MAXIMUM OBSERVED TEMPERATURE MAP
CASA DIABLO GEOTHERMAL FIELD
MONO COUNTY, CALIFORNIA

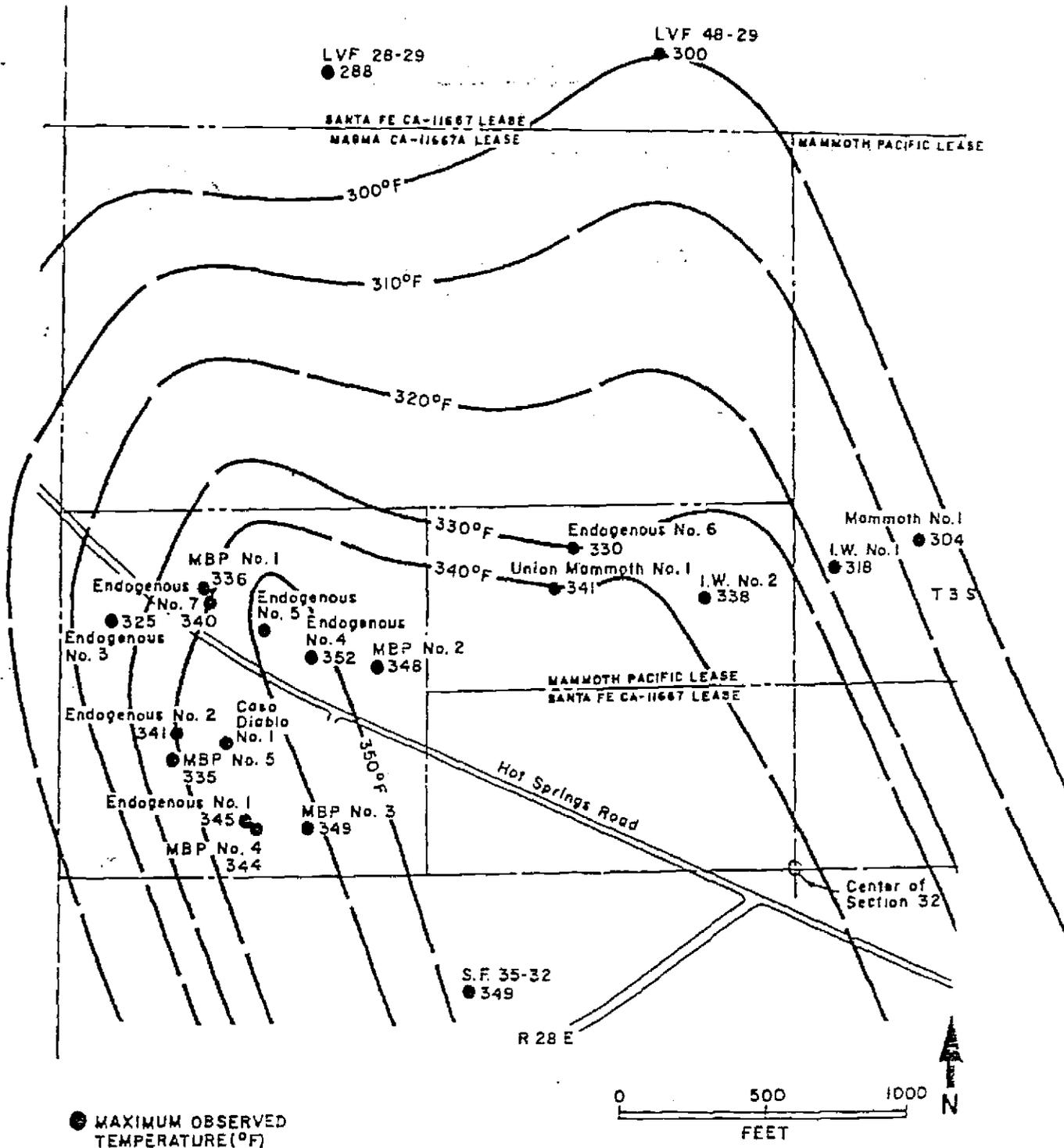


FIGURE 4

CASA DIABLO CROSS SECTION 335° F RESERVOIR

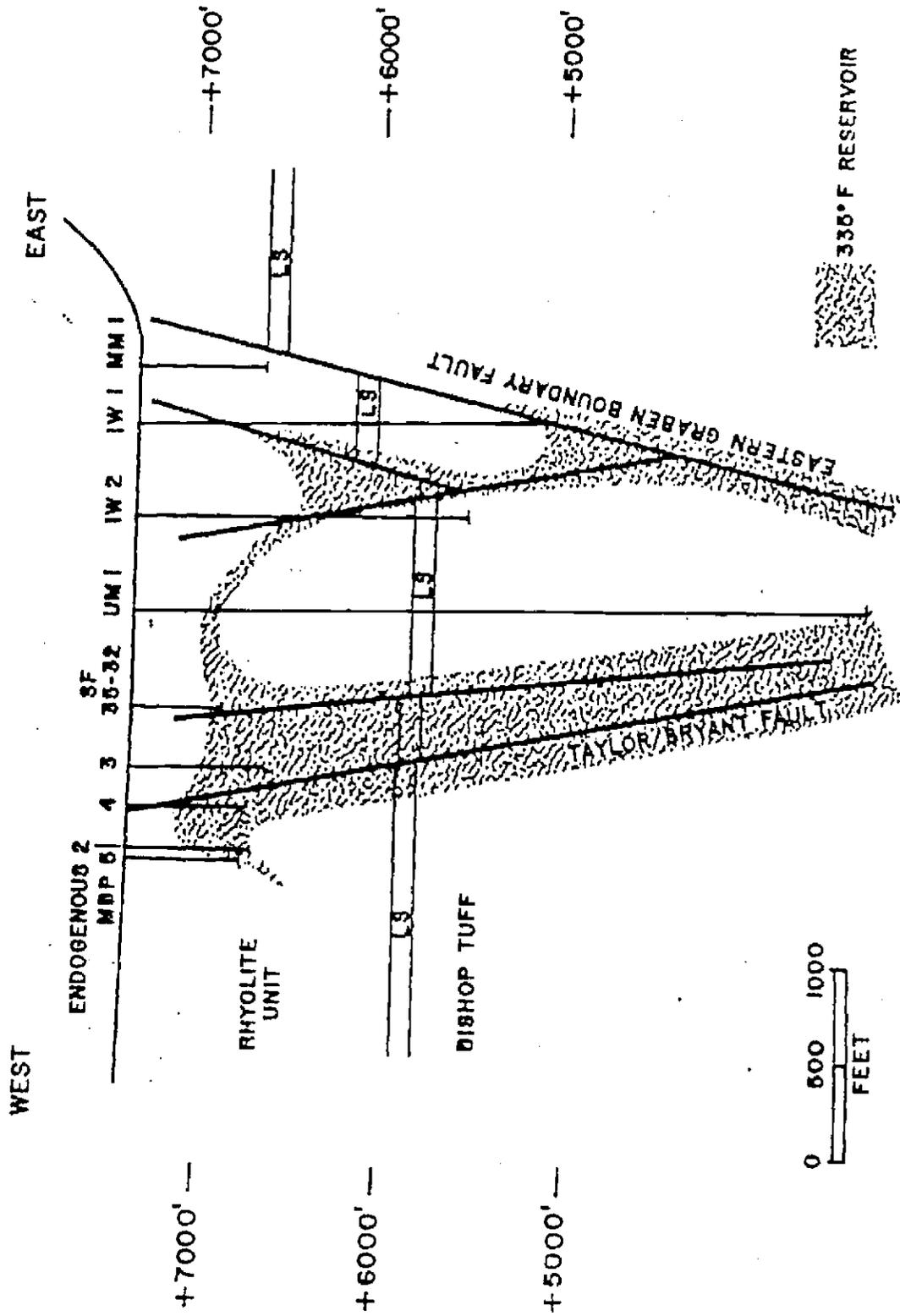


FIGURE 5

UPWELLING / FRACTURE MODEL
SCHEMATIC CROSS SECTION
CASA DIABLO GEOTHERMAL FIELD

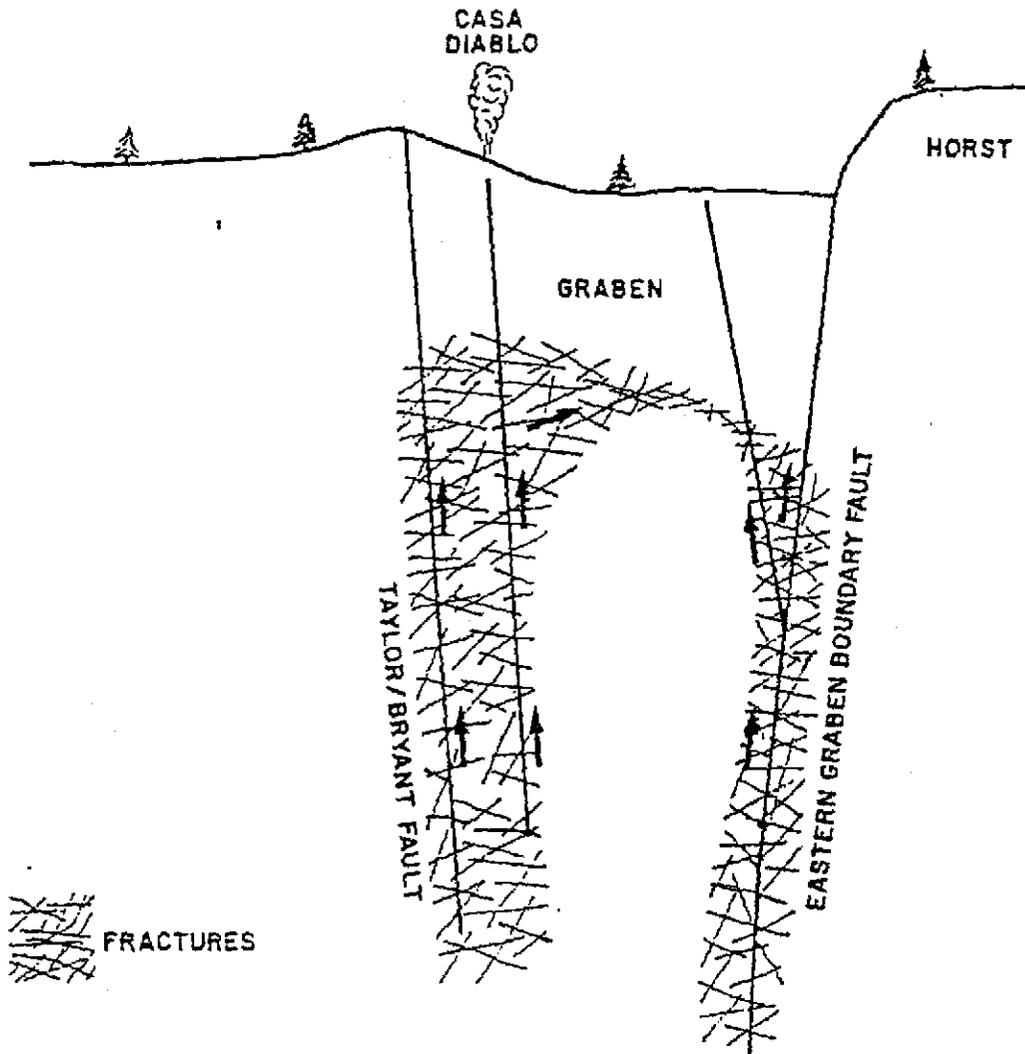


FIGURE 6

LATERAL FLOW MODEL
SCHEMATIC CROSS SECTION

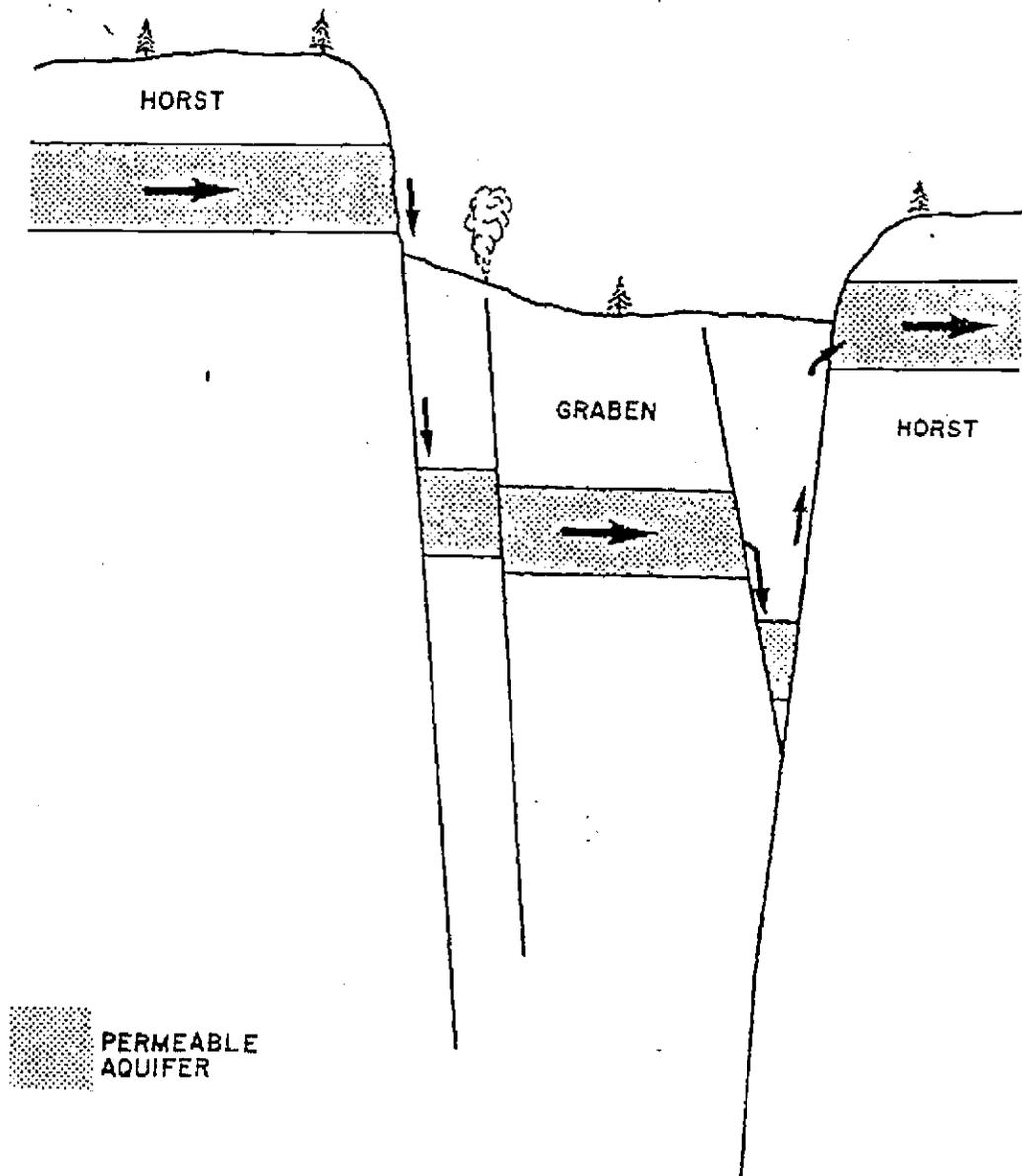


FIGURE 7

FAULTS AND THERMAL FEATURES
LONG VALLEY CALDERA, MONO COUNTY, CALIFORNIA

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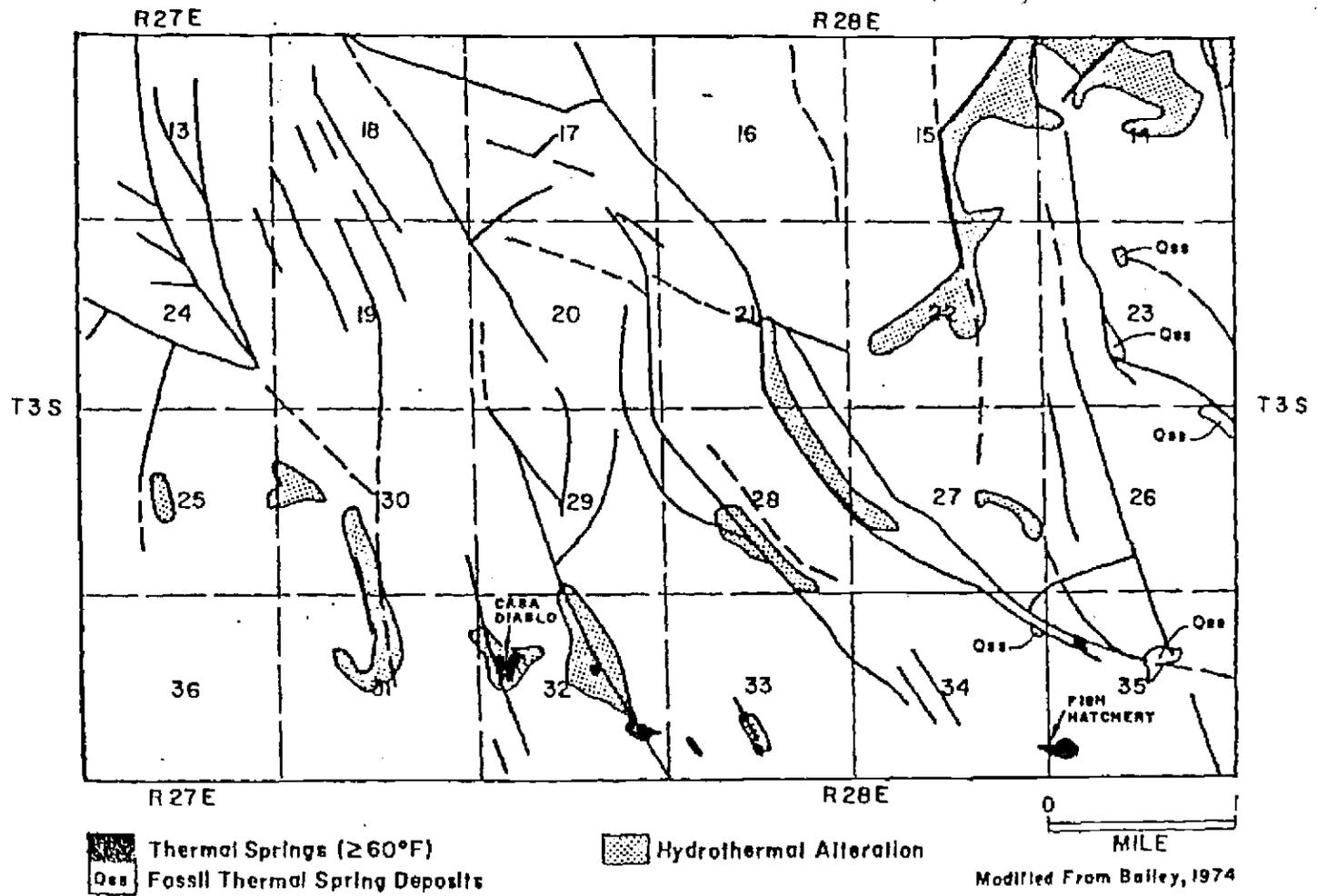
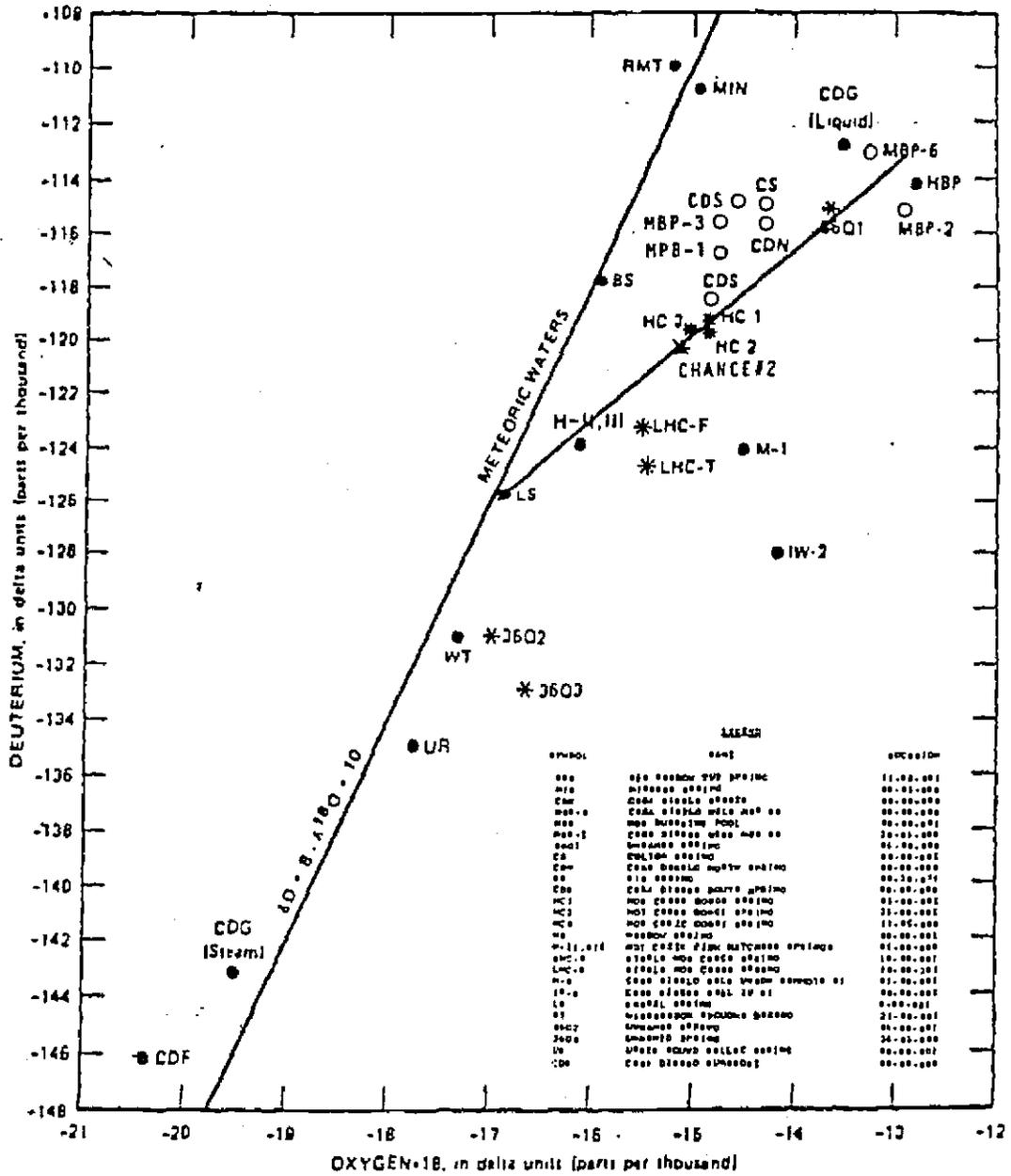


FIGURE 8



Hydrogen vs. Oxygen Isotopes from Long Valley, California Waters (After Farrar, et al., 1985)

FIGURE 9
CASA DIABLO GEOTHERMAL FIELD
TEMPERATURE SURVEY, WELL UNION MAMMOTH I

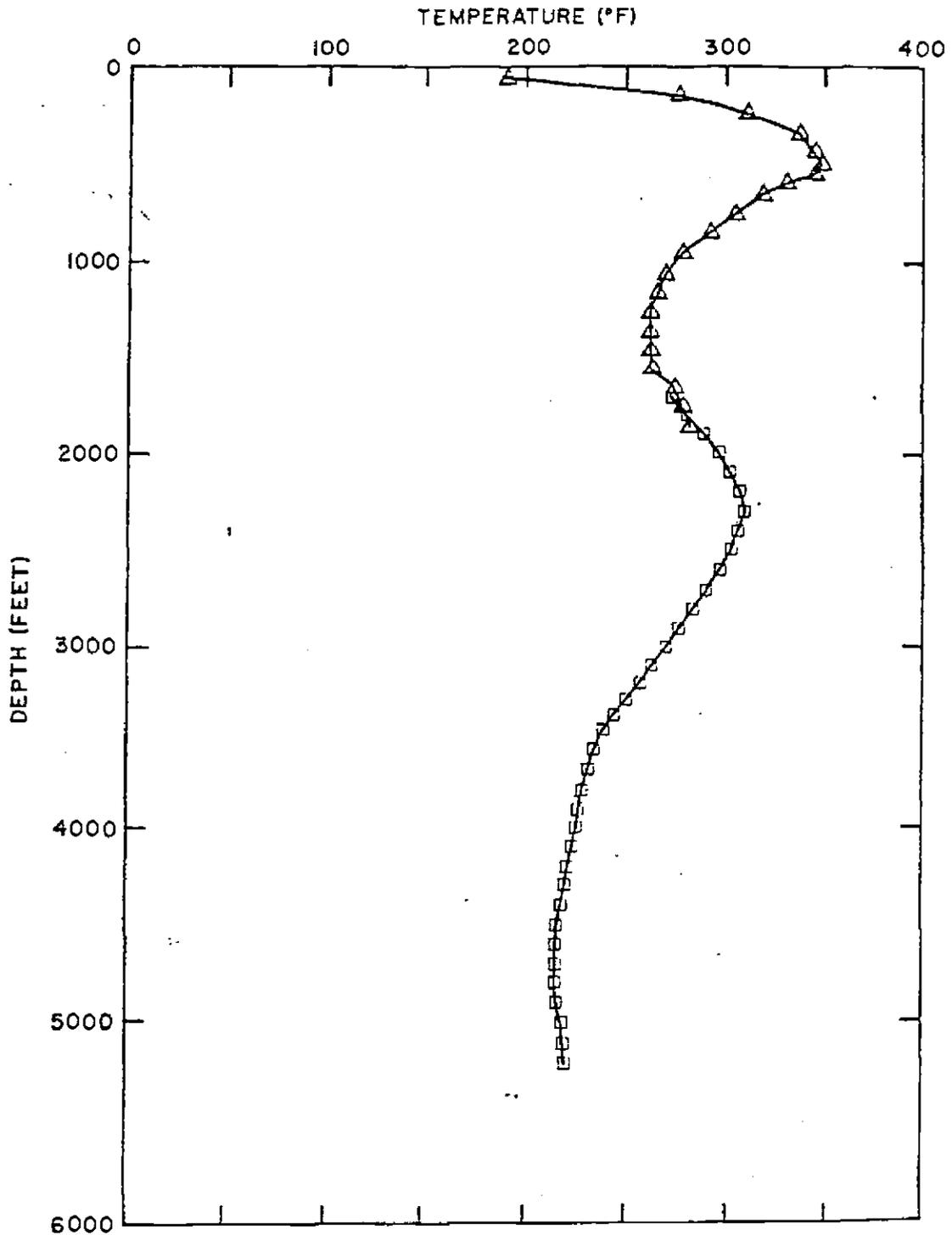


FIGURE 10

THERMAL CROSS SECTION
LONG VALLEY CALDERA
MONO COUNTY, CALIFORNIA

WEST

EAST

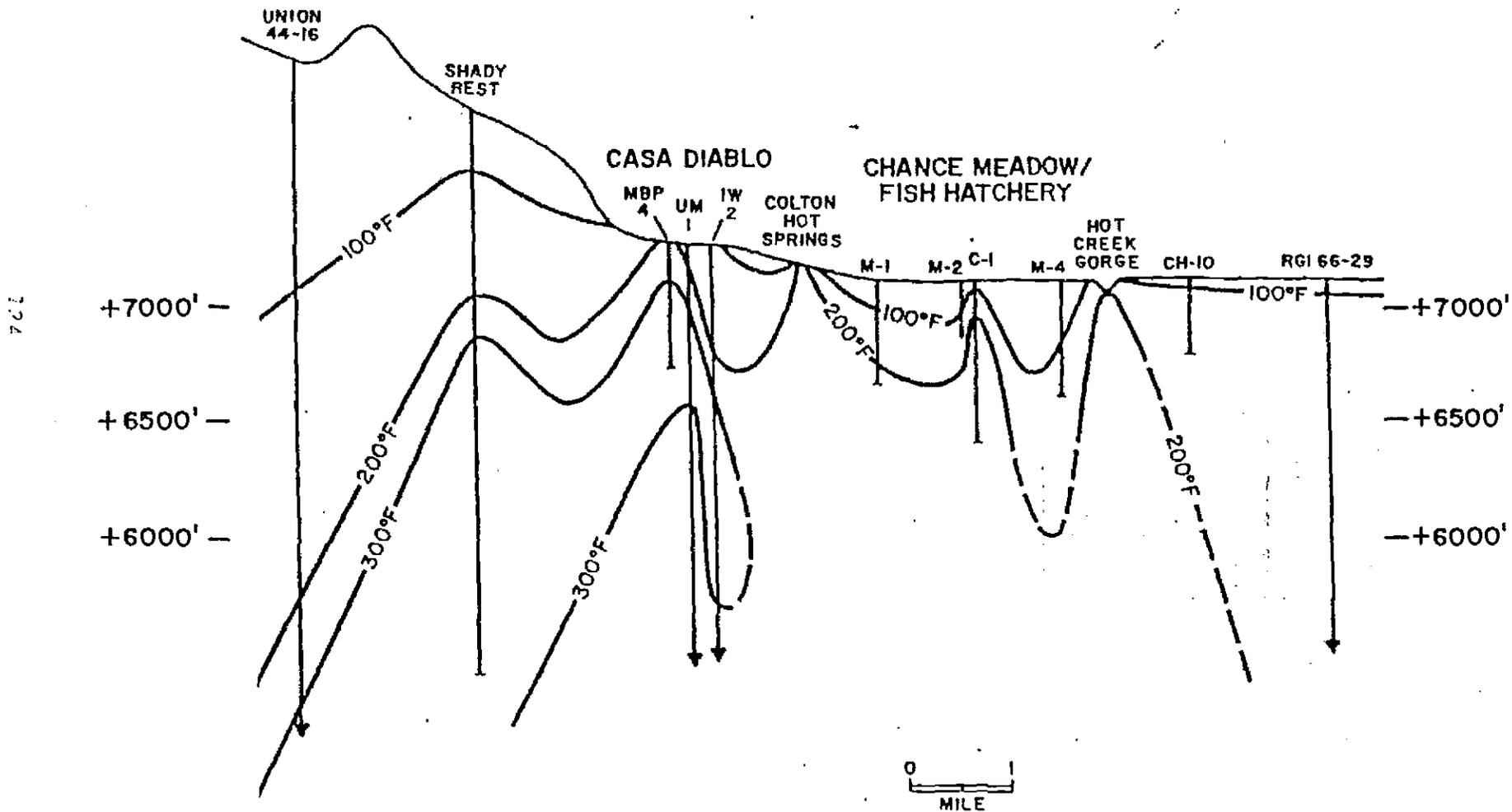
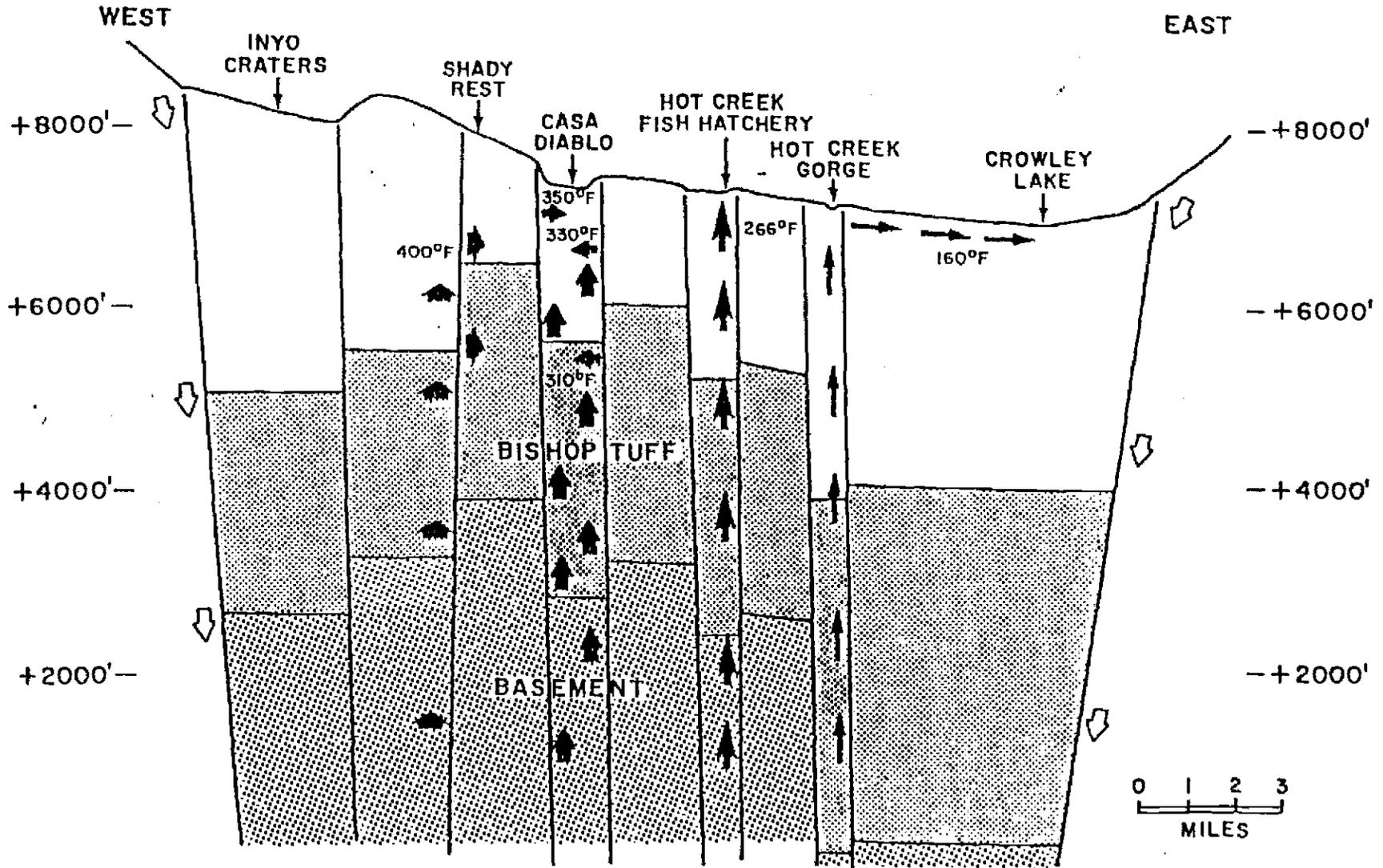


FIGURE 11

UPWELLING/FRACTURE MODEL
GEOLOGICAL CROSS SECTION



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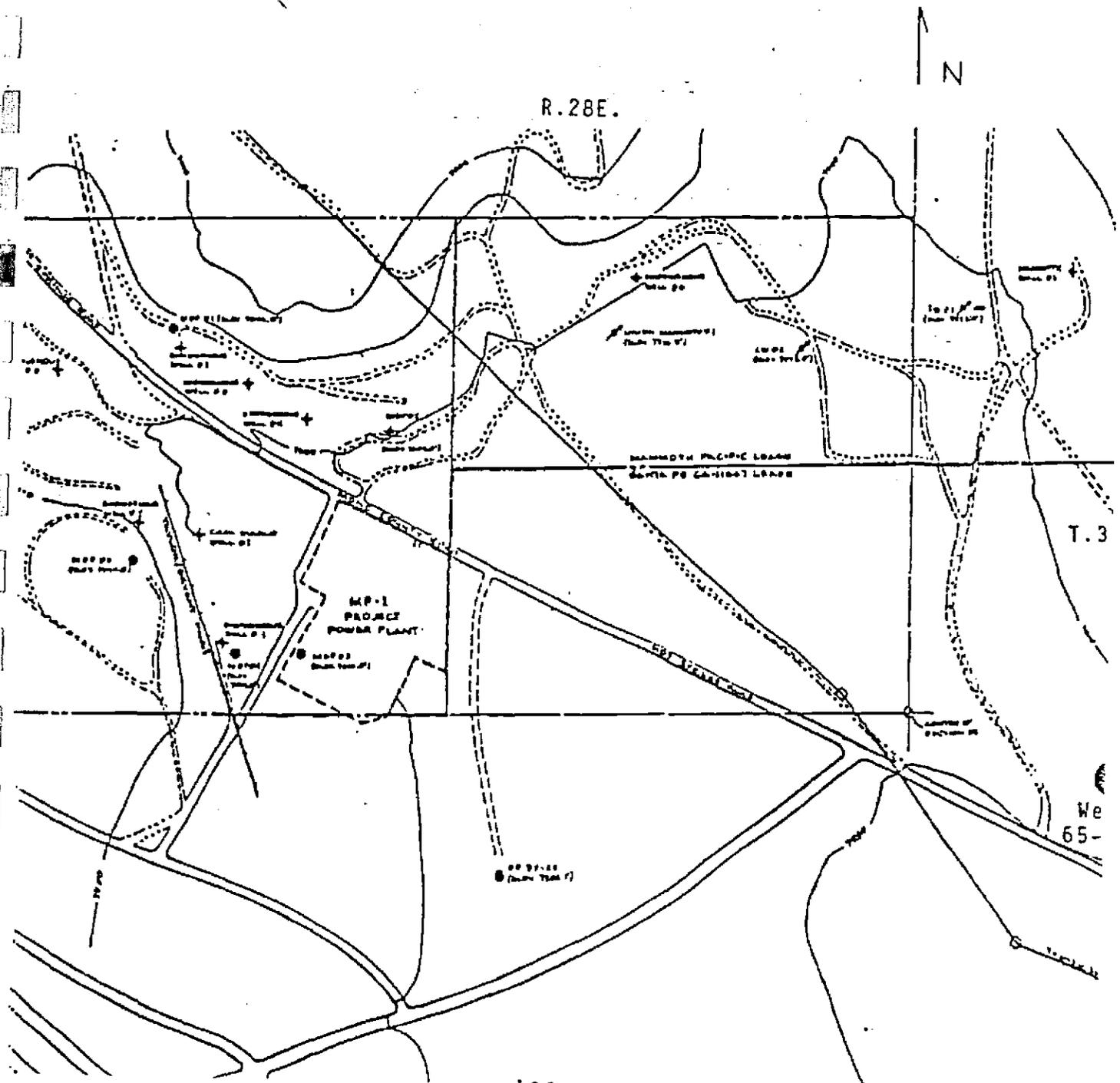
FIGURE 12

LOCATION MAP

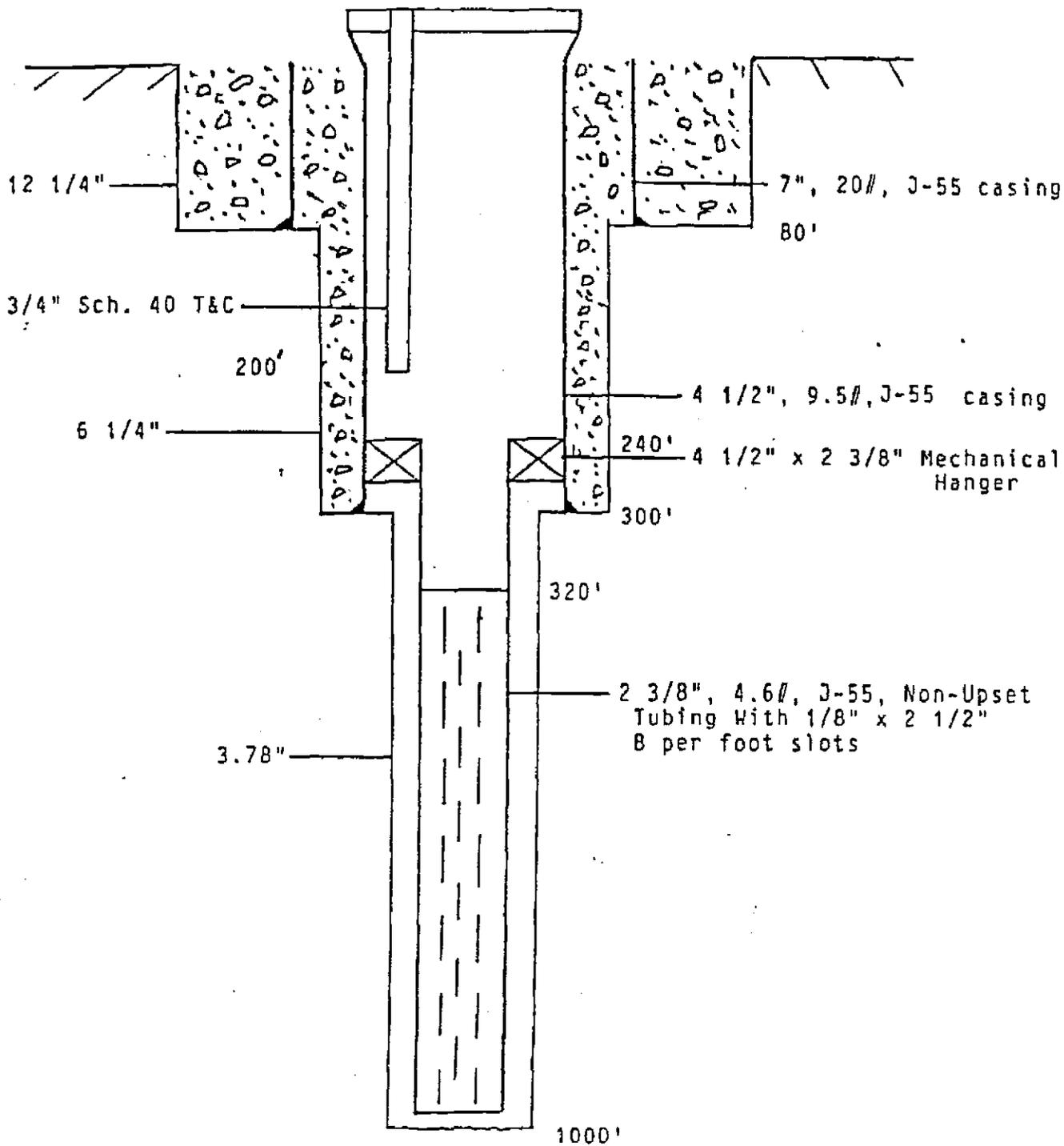
CASA DIABLO OBSERVATION WELL 65-32

MONO COUNTY, CALIFORNIA

LOCATION: Approximately 2950' South and 2150' West of the NE Corner of Section 32, Township 3 South, Range 28 East, M.D.B. & M.



WELL COMPLETION DRAWING
CASA DIABLO OBSERVATION WELL 65-32
MONO COUNTY, CALIFORNIA



SUMMARY OF COMMENTS AT PUBLIC HEARING BEFORE
MONO COUNTY PLANNING COMMISSION

SEPTEMBER 14, 1987

1. Frank Stewart, speaking for Hamilton Hess, Sierra Club:
 - See Sierra Club letter dated 9.6.87.
2. Robert Brown, California Department of Fish and Game, Bishop.
 - No-Project Alternative should be pursued.
 - EIR should more fully discuss economic value of hatchery to the County.
 - EIR should fully discuss effects of past spills at Casa Diablo using CDFG records.
 - Cite experiences at the Geysers to discuss changes in aquatic fauna.
 - Discuss spill containment and waste discharge using the Geysers as a model.
 - Be more specific about proposed containment
3. Lisa Jaeger, Interested Citizen.
 - If the geothermal component of water at the hatchery or Hot Creek Gorge decreases, it should not be the County's responsibility to prove that use of the resource for power generation has caused the loss. The burden of proof should rest with the power plant owners and operators to prove that the power plants are not responsible.
 - Mammoth-Pacific should post bond to cover abandonment or any damage to aquatic resources.
 - EIR should discuss economic loss due to degradation of visual resources.
 - EIR should give cost to administer and monitor geothermal projects.
 - A comprehensive cumulative analysis is needed.
4. Dan Dawson, Mono County Planning Commissioner.
 - EIR should include summary of unmitigable significant impacts. He listed visual, hydrothermal resource, and industrialization of Long Valley in that category.
 - Put all fluid transmission lines below grade.
 - Put all power lines underground.
 - Alternatives are not well developed. Should discuss other alternatives and alternative mitigation measures.
 - Discuss mitigation measures used at the Geysers.
 - EIR should discuss industrialization of Long Valley.
5. Bob Kimball, Mono County Planning Commissioner.
 - Put pipelines below grade in ditches.
 - Burden of proof for damage should not rest on the County.
6. Sydney Quinn, Mono County Planning Commissioner.
 - How many visitor days occur at Hot Creek?
 - There should be much more economic detail, especially about the direct costs and benefits of the County.
 - There should be a definitive discussion of the hydrology.

additional ORCA comment. at 11:55:00 being

Supply of water, geothermal fluid, etc
to compensate or restore and "existing
or present" condition (i.e. temp, p, D.O.

WATER CHEMISTRY @ HOT CREEK HOTSPRING SPRINGS
OR HOT CREEK HOT SPRINGS) is not a realistic
or acceptable mitigation measure.

If the project proponent believes it
to be "acceptable mitigation" further
analysis & discussion must be presented in

the final EIR, and demonstration of capability to
maintain acceptable "supply" must be done.

Full discussion of and the ORCA suggests
that a bond or other mechanism be
posted to cover any loss in hot water
production or aquatic fauna.

~~Final comment (by the ORCA) relationship~~

- 3.1 The proposed relationship between
surface flow shallow groundwater
"constant temperature species" and the
geothermal fluid must be assessed
to the present "state of knowledge" or "state
of the art" or state of "risk or uncertainty."

FROM 15°C TO 90°C DAY
 RISES REGARDING THERMOCALC 5-21-87

THERMOGRAPH DATA HOT CREEK HATCHERY

1986

DATE	A-B Supply READ	C-D Supply READ	C-D Supply Spring	SEAL Pond I	HOT I Supply	HOT II Supply	COYOTE OUTLET	HOT BATH COYOTE
1-2-86	60.9	57.7	55.2	57.4	52.8	51.8	54.7	50.8
1-8-86	61.2	57.9	53.2	54.3	52.8	51.7	54.4	-
1-22-86	61.0	57.8	53.2	54.0	53.7	51.6	54.5	-
2-4-86	61.0	57.8	55.1	53.7	52.7	51.5	54.6	49
2-21-86	61.5	57.6	55.0	53.2	52.6	51.4	54.5	-
3-7-86	60.4	57.6	55.9	53.0	52.4	51.3	54.5	49
3-21-86	60.2	57.2	54.8	52.6	52.6	51.2	54.4	-
4-1-86	60.0	-	54.6	52.2	53.4	51.9	54.2	-
4-14-86	59.8	56.5	54.4	52.4	52.2	50.9	52.4	52.8
4-28-86	59.9	57.2	54.4	52.4	52.2	51.0	54.1	52.6
5-12-86	60.8	57.8	54.1	52.6	52.6	51.0	54.1	52.5
5-29-86	60.0	56.4	54.2	52.6	53.5	51.2	53.8	-
6-9-86	61.2	-	54.1	52.7	52.4	51.0	52.6	52.5
6-24-86	60.4	56.3	54.2	53.5	52.6	51.3	53.6	-
7-15-86	-	-	-	-	53.8	51.4	53.5	-
7-16-86	60.6	56.6	54.1	53.6	-	-	-	-
8-1-86	60.4	56.4	54.4	54.4	53.8	51.8	53.8	-
11-5-86	62.3	57.3	55.0	54.4	53.4	51.7	53.9	50.1
12-12-86	62.0	58.1	55.1	54.2	53.4	51.8	54.0	50.1

5-21-87

THERMOGRAPH DATA

HOT CREEK HATCHERY

1985

DATE	A-B Supply Pool	C-D Supply Pool	C-D Supply Spring	SELECT Pool I	HAT I Supply	HAT II Supply	Comp CUTN	HOT CK GORGE
1-24-85	60.8	57.8	55.0	54.5	53.9	51.3	54.9	53.0
2-9-85	60.8	57.6	55.2	54.0	54.2	51.6	55.2	—
3-7	60.2	57.6	55.0	54.8	54.0	51.4	55.2	54.2
3-20	60.3	57.4	55.1	55.7	54.2	51.4	55.2	54.8
4-11	60.1	57.9	54.8	53.5	55.4	51.4	54.8	62.4
4-17	60.0	58.0	54.8	53.2	53.8	51.4	54.8	49.2
5-20	60.6	57.4	55.0	53.6	54.2	51.3	54.3	< 50
5-31	60.4	58.2	55.0	53.4	54.1	51.3	54.4	49
6-10	60.6	56.8	54.8	53.6	54.0	51.2	64.3	57.3
6-24	60.7	56.7	54.8	53.7	54.1	51.3	54.3	—
8-2-85	61.3	56.8	55.1	53.9	54.2	51.8	54.4	59.2
8-15	61.4	57.1	55.1	54.7	54.2	51.8	54.3	—
9-3	61.5	57.3	55.0	54.7	53.9	51.8	54.2	55.3
7-16	61.7	57.6	55.2	54.7	54.0	51.8	54.2	63.9
10-2	61.7	57.7	55.3	54.9	53.9	51.9	54.3	—
10-16	61.6	57.6	55.2	54.2	52.8	51.8	54.3	53.3
11-13	61.6	57.7	55.3	54.6	53.8	51.9	54.3	52.2
12-2	61.3	57.8	55.2	53.2	53.4	51.8	54.4	—
12-16	61.3	58.0	55.3	53.7	52.8	51.9	54.6	52.6

5-21-87

THERMOGRAPH DATA

HOT CREEK HATCHERY

1984

DATE	A-B Supply Board	C-D Supply Board	C-D Supply Spring	SELECT POINT I	HOT I Supply	HOT III Supply	COYOTE CULCH	HOT CR BOBBE
1-9-84	60.7	57.4	55.5	54.4	52.8	51.9	51.9	52.5
1-25-84	60.6	57.4	55.8	54.0	52.7	51.8	52.5	50.8
2-7-84	60.5	57.4	55.8	53.6	52.7	51.8	54.5	50.1
2-29	60.5	57.5	55.9	53.7	52.7	51.8	54.6	52.4
3-9	60.4	57.6	56.0	53.6	52.6	51.3	54.6	54.0
3-19	60.2	57.5	55.9	53.5	52.6	51.6	54.6	56.7
4-3	60.2	58.0	56.1	53.4	52.6	51.6	54.2	52.2
4-19	60.3	57.4	53.9	53.5	52.7	51.5	54.9	49.6
4-30	60.3	57.4	56.0	52.4	52.7	51.5	54.6	59.0
5-14	60.3	57.5	55.5	53.4	52.7	51.5	54.7	-
5-30	60.3	57.2	55.8	52.7	52.8	51.5	54.8	52.2
6-11-84	60.6	57.4	55.8	54.1	52.8	51.8	54.9	50.4
6-25	60.7	57.1	55.9	54.4	54.0	51.7	55.0	66.0
7-12	60.7	57.1	55.9	54.8	54.1	51.8	55.1	-
7-24	60.8	57.0	55.8	54.9	54.2	51.8	55.2	58.4
8-17	61.1	57.8	55.8	54.8	54.4	52.0	55.4	59.2
8-31	61.2	57.8	55.6	55.7	54.7	52.2	54.4	57.6
9-6	61.3	58.0	55.8	55.9	54.6	52.2	53.6	56.0
10-1	61.2	57.1	55.6	56.0	54.4	52.1	55.5	56.4
10-15	61.5	57.6	55.8	56.2	54.4	52.4	55.8	49.6
10-29	61.6	57.2	55.6	56.2	54.8	52.2	55.6	-
11-30	61.6	57.4	55.4	55.8	54.6	52.2	55.4	52.2

5-21-87

THERMOGRAPH DATA
HOT CREEK HATCHERY

1983

DATE	A-B SUPPLY POND	C-D SUPPLY POND	C-D SUPPLY SPRING	SELECT POND	HAT I SUPPLY	HAT III SUPPLY	COYOTE GULCH	HOT CK BORDE
1-4-83	61.8	59.2	56.2	55.2	52.2	52.9	54.9	48.0
1-10-	61.6	59.6	56.2	54.8	53.8	52.2	55.0	48.2
1-26	61.6	58.0	56.2	54.2	-	52.2	54.4	-
2-7	61.6	58.2	56.4	54.2	54.0	52.0	54.8	-
2-24	60.8	59.1	55.2	54.6	54.4	-	55.2	-
3-11	61.3	-	55.8	54.2	54.2	52.0	54.8	48.8
3-21	60.8	58.0	55.8	54.8	53.7	51.8	54.4	47.4
4-5	60.8	58.4	54.8	54.4	56.2	51.6	54.8	52.9
4-19	60.4	58.1	55.6	53.0	54.1	51.6	54.8	50.6
5-2	60.2	57.8	55.4	52.8	53.8	51.4	54.6	49.2
5-16	60.1	57.4	55.1	52.4	53.8	51.2	54.6	50.4
6-2-83	60.0	58.4	54.9	53.1	53.9	51.4	54.5	52.9
6-13	59.9	57.2	55.1	52.9	54.0	51.4	54.2	49.8
7-6	59.8	57.1	55.0	53.4	54.0	51.8	54.2	46.2
7-13	59.7	56.9	54.9	53.6	54.0	51.8	53.9	52.9
7-28	59.6	56.9	54.9	54.1	54.0	51.9	54.2	56.9
8-8	59.5	56.8	54.9	54.4	54.2	52.0	54.0	65.3
8-25	59.4	57.0	54.8	54.8	54.1	52.0	54.1	-
9-12	59.8	57.0	54.9	55.1	54.2	52.2	54.3	57.6
9-26	59.4	56.9	55.0	55.2	54.1	52.8	54.0	54.8
10-18	59.8	57.6	55.0	55.3	54.0	52.2	54.9	57.1
11-3	60.6	58.2	55.2	55.1	54.0	52.3	54.4	56.9
11-19	60.8	57.4	55.2	55.4	53.6	52.1	54.2	48.8
12-1	60.9	57.3	55.2	53.1	53.8	52.0	54.4	48.2
12-15	61.0	57.5	55.4	54.9	53.8	52.0	54.4	51.1
12-30	60.9	57.4	55.5	54.6	53.8	52.1	54.6	-

5-21-87

THERMOGRAPH DATA HOT CREEK HATCHERY

982

DATE	A-B Supply Pond	C-D Supply Pond	C-D Supply Pond	SELECT POND	HAT I Supply	HAT II Supply	Ogyle Gulch	HICK GORGE				
2-82	61.3	57.2	55.4	55.8	54.2	54.4	55.2					
2-26-82	61.6	57.8	56.2	56.0	54.4	52.2	55.4					
3-8-82	61.4	57.6	56.4	55.4	54.4	52.6	55.5	49				
3-23-82	62.6	59.9	56.9	55.4	54.6	52.4	55.2					
3-31-82	62.2	59.8	56.8	55.4	54.8	52.1	55.4	58.9				
3-24-82	61.8	58.8	56.8	55.8	55.8	52.2	55.5	51				
4-5-82	61.6	58.8	56.2	54.8	54.2	52.2	55.5	52.4				
4-19-82	61.0	59.5	54.6	55.5	55.5	52.4	55.2					
5-6-82	66.7	59.4	56.4	54.2	54.9	52.2	55.2					
5-17-82	61.4	60.0	58.9	54.9	56.9	53	55.8	60.4				
5-31-82	59.9	59.2	57.6	55.2	54.8	52.8	54.9	57.2				
6-15-82	61.9	58.4	56	55.8	54.4	52.5	55.6	58.2				
7-15-82	61.5	58.6	56.2	54.8	55.4	53.8	54.9	58.4				
7-26-82	61.5	58.8	56.4	55.4	55.2	52.5	54.8	59.2				
8-12-82	61.4	57.6	57.0	55.2	54.9	52.9	54.8					
8-23-82	61.8	57.2	56.1	55.8	55.2	52.6						
9-1-82	61.2	57.8	56.0	56.2	55.4	52.0	54.7	54.3				
10-21-82	62.4	57.9	56.1	53.9	55.0	52.8	55.2	51.4				
11-10-82	61.9	57.9	55.9	55.6	54.8	53.0	54.8	55.2				
11-16-82	61.8	57.9	56.1	55.5	54.6	52.6	54.8	51.4				
12-2-82	61.4	57.8	55.6	55.0	53.6	52.2	55.0	46.2				
12-14-82	60.9	57.8	56.2	55.4	53.8	52.4	55.2	48.4				

5-22-87

THERMOGRAPH DATA HOT CREEK HATCHERY

1981

DATE	A-5 SUPPLY POND	C-5 SUPPLY POND	E-5 SUPPLY SPRING	SELECT POND I	HAT I SUPPLY	HAT II SUPPLY	COYOTE CATCH	HOT CREEK GORGE			
1-16-81	62.1	58.8	56.2	55.4	54.4	52.4	—	—			
2-9-81	61.8	58.8	56.2	54.8	54.2	51.2	55	—			
2-23-81	—	58.9	56.1	54.8	54.2	—	—	—			
3-10-81	—	58.7	56.1	54.7	54.2	—	—	—			
3-31-81	—	58.5	56.2	54.6	54.4	51.8	55.6	104			
4-7-81	—	58.4	56.2	54.6	54.2	52.0	55.4	58.2			
4-20-81	61.2	58.6	56.2	53.8	54.4	54.2	55.2	54.6			
5-5-81	60.9	58.6	55.9	54.0	54.5	—	—	—			
5-8-81	—	58.6	56.2	54.8	54.3	—	—	—			
6-1-81	—	58.8	56.2	54.9	54.6	—	—	—			
7-2-81	—	58.9	56.5	54.6	54.6	—	—	—			
7-13-81	—	59.0	56.2	54.9	54.8	—	—	—			
9-23-81	62.5	59.5	57.0	56.8	54.9	52.7	55.1	62.6			
10-22-81	62.2	58.6	56.6	56.2	54.9	52.4	55.1	—			
11-4-81	62.6	58.6	56.4	56.6	54.9	53.6	55.6	55.0			
11-18-81	62.4	58.8	56.7	56.6	54.8	—	55.5	—			
12-7-81	62.6	58.6	56.0	56.0	54.6	52.9	55.4	—			
12-21-81	61.9	58.6	56.6	56.0	54.2	52.4	55.4	49.9			

THERMOGRAPH DATA HOT CREEK HATCHERY

1980

DATE	A-0 SUPPLY POND	C-0 SUPPLY POND	C-0 SUPPLY POND	SELECT POND	HATCHERY SUPPLY	COYOTE CULCH	HOT CREEK GORGE
1-3-87	62.5	58.9	56.9	—	54.6	—	—
1-30-87	62.0	59.0	56.9	55.8	54.8	—	—
2-11-87	62.0	59.0	56.8	54.4	54.6	52.5	55.0
2-27-87	61.8	58.8	56.8	55.4	54.6	52.2	55.6
3-13-87	61.6	58.6	56.6	55.0	54.2	52.4	55.4
3-27-87	61.2	58.6	56.5	54.9	54.4	51.2	55.2
4-16-87	61.3	58.9	56.4	55.0	54.7	51.9	55.4
4-25-87	—	58.9	56.1	54.4	54.2	52.0	55.4
5-13-87	—	58.4	56.2	53.9	54.5	51.9	55.3
6-4-87	—	58.1	56.1	54.6	54.4	51.7	55.2
6-17-87	62.2	58.2	56.0	53.0	54.6	51.8	55.2
7-2-87	—	58.1	56.2	53.9	54.8	51.7	55.1
7-15-87	—	58.8	56.0	54.4	54.6	51.6	54.9
8-15-87	—	58.2	55.9	55.2	54.2	52.0	54.9
8-26-87	62.2	58.2	56.0	55.4	54.6	52.0	54.9
10-14-87	61.4	58.6	56.2	55.2	54.5	52.0	55.0
10-28-87	61.5	57.6	56.2	55.9	53.8	51.8	54.9
11-12-87	62.1	58.8	56.1	55.9	54.9	51.9	55.0
12-16-87	62.6	58.9	56.2	55.8	54.9	52.6	55.2
12-30-87	—	58.9	56.4	55.6	54.6	—	51.2

THERMOGRAPH DATA HOT CREEK HATCHERY

1978

DATE	H-B SUPPLY POND	H-B SUPPLY POND	H-B SUPPLY POND	H-B SUPPLY POND	H-B SUPPLY POND	H-B SUPPLY POND	CAPTURE GULCH	HOT CREEK
1-14-78	61.8	58.8	57.0	55.9	54.9	52.4	—	61.0
3-29-78	61.6	58.6	57.2	54.5	54.7	52.8	56.1	—
4-18-78	61.2	58.4	56.8	54.7	54.8	52.2	56.0	—
5-10-78	60.6	58.8	56.5	54.6	54.6	51.8	—	—
5-31-78	60.6	58.2	56.4	54.2	54.4	51.9	55.9	44.8
7-21-78	61.9	57.4	56.2	54.9	55.8	52.0	—	—
8-15-78	63.0	59.2	56.2	55.4	55.2	52.4	55.2	—
8-29-78	62.6	58.5	56.2	55.4	55.0	52.6	55.2	52.6
9-12-78	—	58.8	56.0	55.0	55.0	52.0	55.0	—
10-5-78	64.5	59.2	56.5	55.2	55.5	53.0	55.0	—
10-17-78	—	59.5	56.5	56.5	55.5	53.0	55.0	—
11-1-78	64.5	59.0	57.0	56.5	55.0	53.0	—	—
11-27-78	62.5	60.0	57.0	56.5	55.0	53.0	—	—
12-5-78	61.5	60.0	57.0	56.5	55.0	53.5	55.0	—
12-19-78	—	59.5	—	56.0	55.0	53.0	—	—

THERMOGRAPH DATA HOT CREEK HATCHERY

1977

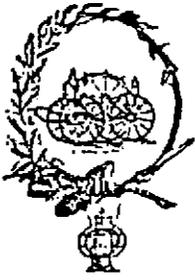
DATE	HAT I SUPPLY	HAT II SUPPLY	COYOTE GULCH	CK GAGE				
1-7-77	62.8	58.0	56.9	56.5	54.9	52.5	---	---
1-25-77	62.5	58.0	56.9	56.4	54.6	52.5	55.2	---
2-7-77	62.4	58.1	56.8	56.3	54.9	52.5	---	---
2-22-77	62.1	58.9	56.8	56.1	54.9	52.5	---	---
3-7-77	62.1	58.8	56.7	55.9	54.8	52.4	55.8	---
3-22-77	61.8	58.7	56.8	55.8	54.9	52.2	---	---
4-4-77	62.0	58.8	56.8	55.7	54.8	52.2	---	---
4-20-77	61.8	58.9	56.7	55.1	54.9	52.1	55.8	65.5
5-4-77	61.8	58.8	56.8	55.4	54.9	52.1	---	---
5-31-77	61.8	58.7	56.9	55.1	54.9	52.1	55.8	70.2
6-30-77	62.0	58.6	56.9	55.0	54.9	52.4	---	---
7-2-77	62.4	58.7	56.7	55.7	55.1	52.3	55.8	---
7-25-77	62.8	58.0	56.2	55.2	55.2	52.4	55.9	---
8-8-77	62.6	58.9	57.0	55.9	55.2	52.4	---	60.8
8-23-77	62.7	58.7	56.8	55.7	55.2	52.5	55.8	---
9-22-77	62.5	59.0	57.1	---	---	---	---	---
10-14-77	62.5	59.0	57.0	56.5	55.0	52.5	---	---
11-15-77	62.5	59.0	57.0	56.8	55.0	52.8	55.8	---
11-30-77	62.5	59.0	57.4	---	---	---	---	---
12-9-77	62.5	58.9	56.8	56.5	54.8	52.7	---	---
12-27-77	62.5	59.3	57.2	56.7	54.9	52.8	---	---

THERMOGRAPH DATA

HOT CREEK HATCHERY

1976

DATE	HAT I Supply	C-D Supply	C-D Supply	REISET Supply	HAT Supply	HAT II Supply	Coyote Gulch	HOT CR GORGE
2-76	62.1	58.2	56.4	55.3	52.8	52.1	55.4	---
7-76	61.9	58.6	56.7	54.8	54.5	51.8	---	---
21-76	61.9	58.1	56.7	54.5	54.4	51.8	55.5	---
4-76	62.2	50.0	52.5	51.8	55.9	52.2	---	---
2-76	62.1	58.7	56.8	55.3	55.2	52.1	55.5	---
26-76	63.2	58.9	57.0	55.8	55.8	52.4	55.0	---
11-76	63.0	58.7	57.5	56.0	54.9	52.3	55.5	---
22-76	64.2	59.0	57.1	---	---	---	---	---
25-76	---	---	---	56.5	55.5	52.5	55.5	---
14-76	63.5	59.0	57.0	56.5	55.0	52.5	---	---
15-76	---	59.3	57.4	56.8	55.0	52.8	55.8	---
11-30-76	63.2	---	---	---	---	---	---	---
12-9-76	---	58.9	56.8	56.5	54.8	52.7	---	---
12-27-76	---	59.3	57.2	56.7	54.9	52.8	---	---



Long Valley Fire Protection District

Rt 1, P. O. Box 1145 • Crowley Lake, CA 93546

Date: September 14, 1987

To: Mono County Planning Department

From: George Lucas, Chief

RE: Fire Protection Requirements for Geothermal Facilities
Producing Electrical Power

The Long Valley Fire Protection District is governed by the 1982 Uniform Fire Code, other nationally recognized standards and certain County and District guidelines. Due to the geographic areas that are being considered for geothermal use and the specific hazards encountered with this type of facility, the Long Valley Fire Protection District is in the process of setting specific guidelines for geothermal facilities within its district.

At this time, specific requirements include:

- A. Access/egress to all areas of a facility
- B. Access/egress shall be an all-weather driving surface capable of supporting the imposed loads of fire apparatus
- C. Access/egress shall be kept clear at all times, i.e. snow
- D. Quantities and locations of water supplies, pump stations, hydrants and fire suppression appliances shall be determined by this Department and the design engineer of specific facilities
- E. Automatic safety shut-downs, alarm systems and back-up systems
- F. Facilities shall provide the Long Valley and Mammoth Lakes Fire Departments with pre-emergency plans and periodic "walk-throughs" of the facility as required
- G. The Long Valley and Mammoth Lakes Fire Departments shall be notified of any impairment to any phase of fire protection or possible hazards, immediately
- H. Mitigation fees, as applicable, shall be imposed (See attached)

September 22, 1987

Comment-2 (Page 1, Paragraph 2): Discussion is needed for assuming complete hydraulic communication between the injection and production zones because the effects of injection dominate the simulated reservoir performance calculations. The GeothermEx report (1986) states that pressure recharge of the production interval is unlikely because the injection and production zones are separated by impermeable rhyolite.

Response-2: While it is true that the injection zones at Casa Diablo are separated from the production zone by 500 to 700 feet of impermeable rhyolite, this interval is transected by numerous faults which are believed to readily conduct fluid vertically between zones in response to pressure gradients.

Comment-3 (Page 1, Paragraph 2 last sentence): The model results show pressure rises east of Casa Diablo - what effects would that have on spring flows?

Response-3: Theoretically, pressure increases to the east should increase thermal spring flows. However, the pressure increases as modelled are small and the degree of spring response is unknown, but likely to be negligible.

Comment-4 (Page 1, Paragraph 3): Calculations of the rate of propagation of a cold temperature front suggest that the front could reach the vicinity of the nearest production well (about 650 feet) at Casa Diablo in less than 10 years.

Response-4: In addition to the 650-foot radial advance modelled, reality would require injected fluids to also rise 500 to 700 feet through mostly hot rock. Furthermore, density effects (not modelled) would probably result in the injected water initially flowing downward along the faults until sufficiently heated by conductive heat transfer from the rock and mixing to rise along with other upwelling hot water. Even if breakthrough of cold injected water does occur, such events are commonly handled in oil field waterflooding by appropriate adjustments in injection and/or production patterns, and should not be a threat to project longevity.

September 14, 1967

All geothermal facilities shall be analyzed on a case-by-case basis and final determination shall be the result of reviews and agreements of District requirements between facility owner/operator, design engineers, any other agencies involved and the Long Valley Fire Protection District.

Note: For review, refer to Mammoth/Chance Geothermal Development Project, section on Fire Protection, July 1967

cc: Dan Lyster
Long Valley Fire Protection District files



Long Valley Fire Protection District

Rt. 1, P. O. Box 1145 • Crowley Lake, CA 93546

AMENDMENT TO RESOLUTION NO. 82-J

Page 2, Item No. 2

Paragraph 3: The inclusion of Geothermal Facilities producing electric power within the Long Valley Fire Protection District does represent a distinct, significant impact to the District.

- A. Geothermal Facilities are essentially constructed of non-combustible materials.
- B. Impacts to the District are directly related to the storage and use of secondary working fluids, such as iso-butane and iso-pentane. Other impacts would include high temperature, primary fluids and hydrogen sulfide.

Therefore the assessment of Geothermal Facilities based on square footage is not applicable. To correlate this type of assessment, the British Thermal Unit, or B.T.U. shall be used.

Example: Iso-pentane

Fire of the average structure produces approximately 3,000 B.T.U.'s per square foot per minute.

Iso-pentane produces approximately 21,000 B.T.U.'s per pound with a weight of 5.17 pounds per gallon, or approximately 108,000 B.T.U.'s per gallon, or 36 square feet of average structure fire.

In correlating, 36 square feet x .30 = \$10.80 would be the approximate base rate for one gallon of iso-pentane.

Credit for Reduction to Base Rate:

- A. Reduction up to 50% Upon review of location, population, local hazards, and access
- B. Reduction up to 20% Automatic shut-down, safety systems, back-up systems, alarm systems
- C. Reduction up to 00% Stationary fire suppression systems, general safety features, etc.

Example only: With interest rate of 10% a B.T.U. of 108,000 B.T.U. rate would be \$2.27 per gallon of iso-pentane.

043/E.E.

AMENDMENT TO:

RESOLUTION NO. 82-1

A RESOLUTION OF THE LONG VALLEY FIRE PROTECTION DISTRICT DECLARING EXISTING FACILITIES FOR FIRE PROTECTION INADEQUATE TO PROTECT ADDITIONAL STRUCTURES WITHOUT MITIGATION

Subject: Geothermal Facilities

WHEREAS, the inclusion of Geothermal Facilities producing electric power within the Long Valley Fire Protection District does represent a distinct, significant impact to the District; and

WHEREAS, Geothermal Facilities are essentially constructed of non-combustible materials; and

WHEREAS, impacts to the District are directly related to the storage and use of secondary working fluids, such as iso-butane and iso-pentane, other impacts would include high temperatures, primary fluids and hydrogen sulfide.

THEREFORE, the assessment of Geothermal facilities based on square footage is not applicable. To correlate this type of assessment, the British Thermal Unit, or B.T.U. shall be used.

Example: Iso-pentane

1. Fire of the average structure produced approximately 3,000 B.T.U.'s per square foot per minute.
2. Iso-pentane produces approximately 21,000 B.T.U.'s per pound, with a weight of 5.17 pounds per gallon, or approximately 108,000 B.T.U.'s per gallon, or 36 square feet of average structure fire.
3. In correlating, 36 square feet x .30 = \$10.80, would be the approximate base rate for one gallon of iso-pentane.

Credit for Reduction to Base Rate:

- A. Reduction up to 50% Upon review of location, population, local hazards and access
- B. Reduction up to 20% Automatic shut-downs, safety systems back-up systems, alarm systems
- C. Reduction up to 0% Stationary fire suppression appliances, safety features, etc.

2

Example only:

With the highest % of items A, B, and C, an assessed rate would be \$2.27 per gallon iso-pentane.

RECEIVED

SEP 15 1987

MONROE COUNTY
OFFICE OF ENERGY MANAGEMENT

This Board hereby requests that the Board of Supervisors of the County of Mono adopt an amendment to existing Ordinance or Resolution disapproving any tentative tract map, parcel map, conditional use permit, or planned unit development providing for new geothermal facilities within the boundaries of the District unless its developers have agreed in writing to a means by which the impact caused by the project will be adequately mitigated.

This Board also requests that any permit for development, and any use or building permits for geothermal facilities, approved by the County, be conditioned to require such mitigation.

The Clerk of the Board of the Long Valley Fire Protection District is directed to transmit a copy of this resolution forthwith to the Board of Supervisors of the County of Mono, and to both the Mono County Planning Department and the Mono County Building Department.

ADOPTED by the Long Valley Fire Protection District of the County of Mono, State of California, this ____ day of _____, 1987.

CHAIRMAN,
Board of Commissioners
Long Valley Fire Protection District

ATTEST:

Secretary, Board of Commissioners
Long Valley Fire Protection District

I, _____ Secretary of the Board of Commissioners of the Long Valley Fire Protection District, do hereby certify that the foregoing resolution was regularly introduced and adopted at a regular meeting of said Board, duly called and held on the ____ day of _____, 1987, and was duly passed and adopted by the following vote, to wit:

AYES:

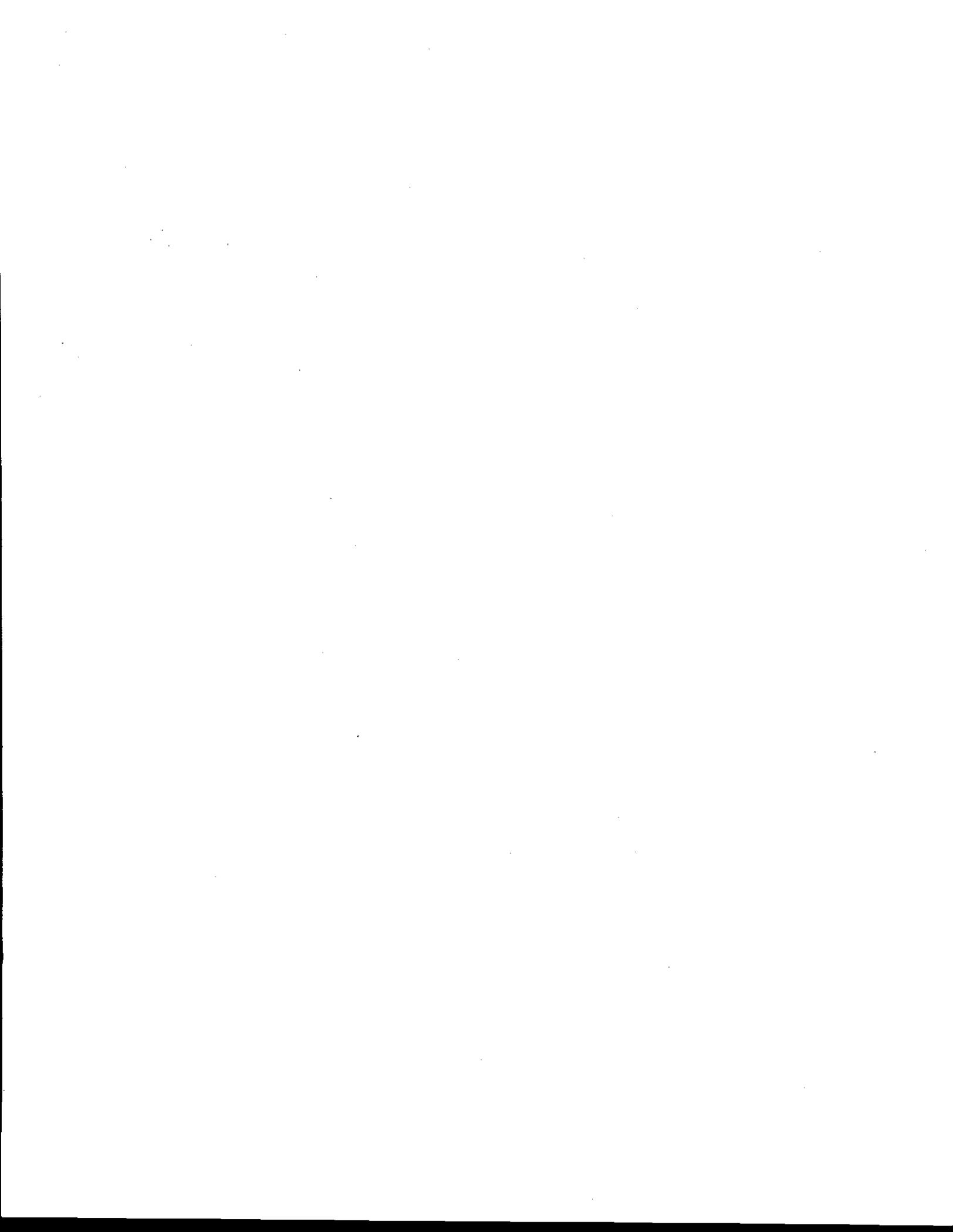
NOES:

ABSENT:

Secretary
Board of Commissioners
Long Valley Fire Protection District

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EXHIBIT 38



**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION**

ORDER NO. R7-2008-0004

**WASTE DISCHARGE REQUIREMENTS (REVISION 1)
FOR**

**ORNI 17, LLC. WELL FIELD OWNER, ORNI 18, LLC, POWER PLANT OWNER
ORMAT NEVADA INC., FACILITY OPERATOR
NORTH BRAWLEY GEOTHERMAL PROJECT
WELLFIELD MUD SUMPS/CONTAINMENT BASINS
North Brawley Known Geothermal Resource Area (KGRA) - Imperial County**

The California Regional Water Quality Control Board, Colorado River Basin Region, finds that:

1. Board Order No. R7-2007-0012 is being revised to address the handling and disposal of drilling wastes generated during installation of geothermal production wells and geothermal injection wells on private land within the North Brawley Known Geothermal Resource Area (KGRA).
2. The KGRA is located north of the town of Brawley in Imperial County. The address for Ormat Nevada Inc., ORNI 17, LLC., and ORNI 18 LLC. is 6225 Neil Road, Suite 300, Reno, Nevada 89511.
3. ORNI 17, LLC, Well Field Owner, ORNI 18, LLC, Power Plant Owner, Ormat Nevada, Inc., Facility Operator, Victor V. & Janet D. Veysey Trust, Landowner, John Robert Benson, Landowner, Barbara Meyer, Landowner, Jack Bros, Inc., Landowner, Daniel H. and R.J. Lillywhite, Landowners, and Brawley Development Group c/o Tierra Management, Landowner are hereinafter collectively referred to as "Dischargers."
4. Board Order No. R7-2008-0004 regulates the handling and disposal of drilling wastes generated by Ormat Nevada Inc. during well drilling, testing, and maintenance of geothermal production wells and geothermal injection wells installed within the North Brawley KGRA. The location of the North Brawley KGRA is shown on Attachment A.
5. To gather scientific information on the geothermal resource and its power generating potential, Ormat Nevada Inc. installed five (5) of the six (6) geothermal exploration wells permitted by Board Order No. R7-2007-0012. Based on data collected, Ormat Nevada Inc. intends to construct a 49.9 megawatt binary power plant in the area.
6. The binary power plant will be a "zero discharge" facility. All wastewaters generated within the facility will be reinjected into the geothermal resource.
7. Including the five (5) geothermal exploration wells, Ormat Nevada Inc. will install a maximum of twenty to twenty-six (20-26) production wells and a maximum of fourteen to twenty (14-20) injection wells in the North Brawley KGRA. The five (5) exploration wells will be converted to either production or injection wells such that the maximum number of both production and injection wells for the project will not exceed forty (40).

Ormat Nevada, Inc.
North Brawley Geothermal Power Project
Waste Discharge Requirements (Revision 1)

8. All geothermal well drilling performed by Ormat Nevada within the North Brawley KGRA will be regulated under this Order. Locations of the proposed production and injection wells are shown on Attachment B.
9. Ormat Nevada Inc. submitted a new Report of Waste Discharge dated June 29, 2007 for the North Brawley Geothermal Project.
10. The project will consist of well pad construction, geothermal well drilling and geothermal waste handling/disposal. A typical well pad is shown on Attachment C.
11. The discharger has enrolled in the construction stormwater program, General Permit 99-08 DWQ, and has submitted a stormwater pollution prevention plan for project construction.
12. Definition of terms used in this Board Order:
 - a. **Facility** – The entire parcel of property where Ormat Nevada Inc. or related geothermal industrial and drilling activities are conducted.
 - b. **Waste Management Unit (WMUs)** – Mud sumps/containment basins are WMUs.
 - c. **Discharger** – Any person who discharges waste that could affect the quality of the waters of the State, and includes any person who owns the land, waste management unit, or who is responsible for the operation of a waste management unit.

Geothermal Drilling Wastes

13. The following wastes are generated during construction, operation, and maintenance of geothermal wells:
 - a. **Geothermal brine** - The Discharger reports geothermal brines in the area of the North Brawley KGRA are hot saline solutions that contain Total Dissolved Solids (TDS) ranging from 12,000 to 60,000 mg/L. Based on the results from the five (5) exploration wells, nearby geothermal projects, major constituents of the brine are predicted to be the following:
 1. Sodium (Na)
 2. Chloride (Cl)
 3. Calcium (Ca)
 4. Potassium (K)
 5. Sulfate (SO₄)
 6. Lithium (Li)
 7. Lead (Pb)
 8. Arsenic (As)
 - b. **Drilling muds with additives** – Drilling mud is inert mineral clay such as bentonite clay. Drilling mud additives may include sodium bicarbonate, soda ash, drilling soap, organic polymers, wood fibers, graphite, cottonseed hulls, walnut shells and cement. Drilling mud additives do not render the drilling mud hazardous when used according to manufacturer's specifications.

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- c. **Drill cuttings (rock)** – small rock fragments pulverized during drilling and forced to the surface by drilling mud, aerated mud, and/or air.

Drilling Waste Containment (WMUs)

14. The Discharger proposes to contain geothermal brine generated during drilling, testing, or maintenance by discharging into large portable tanks. Geothermal brine will be returned to the geothermal resource via injection, or discharged offsite into permanent Class II surface impoundments constructed pursuant to Title 27 of the California Code of Regulations (Title 27).
15. Drilling muds and rock cuttings generated during well drilling, testing, or maintenance will be discharged to mud sumps/containment basins designed to temporarily (less than one (1) year) contain the material while drying. Mud sumps/containment basins will be built with a minimum of twelve (12) inches of compacted clay with permeability of approximately 1×10^{-6} cm/sec, or a synthetic liner(s) providing equivalent protection. Each mud sump/containment basin will be approximately 100 feet by 250 feet by 5 feet deep, and will be operated to maintain a minimum of two (2) feet of freeboard.
16. Geothermal wells are drilled to minimize mixing of drilling mud and cuttings with geothermal brine. Only a small amount of brine may commingle with drilling mud, primarily brines in that part of the formation displaced by the drill bit. Geothermal brine will not be discharged into mud sumps/containment basins. Standing fluid observed in mud sumps/containment basins (if any) will be removed immediately, stored in portable tanks, and returned to the geothermal resource, or discharged offsite into Class II surface impoundments constructed pursuant to Title 27.
17. Clay liner compaction must be certified by a Civil Engineer or Certified Engineering Geologist registered by the State of California. Synthetic liner placement and welding must be certified by the installer to verify factory requirements were satisfied, and no damage occurred during placement. Both types of certification must be submitted, in writing, to the Regional Board prior to use of the temporary mud sump/containment basin. After cleanout of discharged geothermal solids, the integrity of the liner must be re-certified before reuse.

Drilling Waste Disposal

18. Liquid wastes produced from drilling, testing, and maintenance of geothermal wells will be contained in portable tanks and returned to the geothermal resource, or discharged off-site to Class II surface impoundments built to construction standards of Title 27.
19. Solids discharged to mud sumps/containment basins will be removed offsite or closed in place, provided that representative samples of solids are shown not to be hazardous or designated waste.

Surface Water

20. Surface water in the area of the North Brawley KGRA consists of canals and agricultural drains operated and maintained by Imperial Irrigation District.

21. The Facility is not located in a 100-year flood plain.

Regional Groundwater

22. The regional groundwater flow direction within the Imperial Valley is toward the Salton Sea, a closed basin with a surface elevation of approximately 225 feet below sea level. The North Brawley KGRA is located approximately 120 feet below sea level; groundwater flows in a general northwest direction.

Local Groundwater

23. The Discharger reports that shallow groundwater in the area of the North Brawley KGRA occurs approximately ten (10) feet below ground surface, flows generally to the northwest, and has a TDS concentration ranging from 10,000 to 20,000 mg/L.
24. Groundwater depth, gradient, and quality in the area of the North Brawley KGRA may be influenced, at times, by irrigation of adjacent agricultural fields, and by recharge from nearby canals.

Regional Geology

25. The North Brawley Geothermal Exploration site is located within the Salton Trough area of southeast California. The Salton Trough is a tectonically active zone containing numerous faults associated with the San Andreas Fault Zone. The site is located on the north-central portion of the trough, and is underlain by deltaic and lacustrine formations associated with the Colorado River delta. Bedrock in this part of the Salton Trough is approximately three (3) miles below ground surface.

Climate

26. Climate in the region is arid. Climatological data obtained from 1951 to 1980 indicate an average seasonal precipitation of 2.5 inches, and an average annual pan evaporation rate greater than 100 inches.
27. The wind direction follows two general patterns:
 - a. Seasonally from fall through spring, prevailing winds are from the west and northwest. Most of these winds originate in the Los Angeles basin. Humidity is lowest under these conditions.
 - b. Summer weather patterns are dominated by intense heat induced low-pressure areas that form over the interior desert, drawing air south of the Facility. Humidity is highest under these conditions.

Basin Plan

28. The Water Quality Control Plan (Basin Plan) for the Colorado River Basin Water Board, as amended to date, designates the beneficial uses of ground and surface waters in this region.

Ormat Nevada, Inc.
North Brawley Geothermal Power Project
Waste Discharge Requirements (Revision 1)

29. The beneficial uses of groundwater in the Imperial Hydrological Unit are:

- a. Municipal Supply (MUN)*
- b. Industrial Supply (IND)

*With respect to the MUN designation, the Basin Plan states: "At such time as the need arises to know whether a particular aquifer which has no known existing MUN use should be considered as a source of drinking water, the Regional Board will make such a determination based on the criteria listed in the 'Sources of Drinking Water Policy' in Chapter 2 of the Basin Plan. An indication of MUN for a particular hydrologic unit indicates only that at least one of the aquifers in that unit currently supports a MUN beneficial use. For example, the actual MUN usage of the Imperial Hydrologic Unit is limited only to a small portion of that ground water unit."

30. The beneficial uses of surface waters in the area of the North Brawley Geothermal Power Project are as follows:

a. Imperial Valley Drains

- i. Freshwater Replenishment (FRSH)
- ii. Water Contact Recreation (RECI)
- iii. Non-contact Water Recreation (RECII)
- iv. Warm Freshwater Habitat (WARM)
- v. Wildlife Habitat (WILD)
- vi. Preservation of Rare, Threatened, or Endangered Species (RARE)

b. All American Canal System

- vii. Municipal (MUN)
- viii. Agricultural (AGR)
- ix. Aquaculture Supply (AQUA)
- x. Freshwater Replenishment (FRSH)
- xi. Industrial (IND)
- xii. Groundwater Recharge (GWR)
- xiii. Water Contact Recreation (RECI)
- xiv. Non-Contact Water Recreation (RECII)
- xv. Warm Freshwater Habitat (WARM)
- xvi. Wildlife Habitat (WILD)
- xvii. Hydropower Generation (POW)
- xviii. Preservation of Rare, Threatened, or Endangered Species (RARE)

Storm Water

31. Federal regulations for storm water discharges were promulgated by the U.S. Environmental Protection Agency (40 CFR Parts 122, 123, and 124). The regulations require specific categories of facilities that discharge storm water associated with industrial activity to obtain a National Pollutant Discharge Elimination System (NPDES) permit, and to implement Best Conventional Pollutant Technology (BCPT) to reduce or eliminate industrial storm water pollution.

Anti-Degradation Policy

32. State Water Resources Control Board (State Water Board) Resolution No. 68-16 ("Policy with Respect to Maintaining High Quality Waters of the State"; hereafter Resolution No. 68-16) requires a Regional Board, in regulating the discharge of waste, to maintain high quality waters of the state (i.e., background water quality) until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in plans and policies (e.g., violation of any water quality objective). The discharge is required to meet waste discharge requirements that result in the best practicable treatment or control of the discharge necessary to assure pollution or nuisance will not occur, and the highest water quality consistent with maximum benefit to the people will be maintained.

CEQA

33. The Imperial County Planning Department prepared a Mitigated Negative Declaration for the North Brawley Development Project. The Imperial County Planning Commission certified the Mitigated Negative Declaration during a meeting on November 14, 2007. The Board has considered the Mitigated Negative Declaration. Compliance with these WDRs should prevent and mitigate any water quality impacts.

Notification

34. The Regional Board has notified the Discharger and all known interested agencies and persons of its intent to adopt (WDRs) for said discharge, and has provided them with an opportunity for a public meeting and to submit comments.
35. The Regional Board, in a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, that in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted there under, the Dischargers shall comply with the following:

A. Specifications

1. The treatment or disposal of wastes at this facility shall not cause pollution or nuisance, as those terms are defined in Section 13050 of Division 7 of the California Water Code.
2. Waste material at this facility must be contained at all times.
3. Containment of waste shall be limited to the areas designated for such activity. Any revision or modification of the waste containment area or change in operation that alters the nature and constituents of the waste produced must be submitted in writing to the Regional Board Executive Officer for review and approval before the change in operation or modification of the designated area is implemented.
4. Prior to drilling a new well at the facility, the Discharger shall notify, in writing, the Regional Board Executive Officer of the proposed change.

Ormat Nevada, Inc.
North Brawley Geothermal Power Project
Waste Discharge Requirements (Revision 1)

5. Any substantial increase or change in volume of material to be discharged under this Order must be submitted in writing to the Regional Board Executive Officer for review and approval.
6. Liquid or solid geothermal waste discharged to tanks shall be contained at all times.
7. A minimum freeboard of two (2) feet shall be maintained in mud sumps/containment basins at all times.
8. Following well completion, residual solids and semisolids contained in tanks shall be tested for constituents listed in Monitoring and Reporting Program No. R7-2008-0004, and for additional constituents requested by Regional Board Executive Officer (if any). Disposal of this material shall be in accordance with applicable laws and regulations based on analytical results of sampling and analysis.
9. Prior to removing solid material discharged to mud sumps/containment basins, the material shall be tested for constituents listed in Monitoring and Reporting Program No. R7-2008-0004, and for additional constituents requested by the Regional Board Executive Officer (if any). Disposal of this material shall be in accordance with applicable laws and regulations based on analytical results of sampling and analysis.
10. Public contact with material containing geothermal wastes shall be precluded through fences, signs, or other appropriate alternatives.
11. Mud sumps/containment basins shall be constructed, operated and maintained to ensure their effectiveness, in particular:
 - a. Erosion control measures shall be implemented;
 - b. Liners in mud sumps/containment basins shall be maintained to ensure proper function; and
 - c. Solid material shall be removed from mud sumps/containment basins in a manner that minimizes the likelihood of damage to the liner.
12. Upon ceasing operation at the facility, all waste, natural geologic material contaminated by waste, and surplus or unprocessed material shall be removed from the site and disposed of in accordance with applicable laws and regulations.
13. Surface drainage from tributary areas or subsurface sources shall not contact or percolate through waste discharged at this site.
14. The Discharger shall use the constituents listed in Monitoring and Reporting Program No. R7-2008-0004 and revisions thereto as "Monitoring Parameters".
15. The Discharger shall implement the attached Monitoring and Reporting Program No. R7-2008-0004 and revisions thereto to detect at the earliest opportunity any unauthorized discharge of waste constituents from the facility, or any impairment of beneficial uses associated with (caused by) discharges of waste to the mud sumps/containment basins.

Ormat Nevada, Inc.
North Brawley Geothermal Power Project
Waste Discharge Requirements (Revision 1)

16. Water used for the process and site maintenance shall be limited to the amount necessary for the process, dust control, and cleanup and maintenance.
17. The Discharger shall not cause or permit the release of pollutants or waste constituents in a manner that could cause or contribute to a condition of contamination, nuisance, or pollution.

B. Prohibitions

1. Geothermal wells shall be drilled to minimize mixing of drilling mud and cuttings with geothermal brine. Only a small amount of brine may commingle with drilling mud, primarily brines in that part of the formation displaced by the drill bit. Geothermal brine shall not be discharged into mud sumps/containment basins. Standing fluid observed in mud sumps/containment basins (if any) will be removed immediately, stored in portable tanks, and returned to the geothermal resource, or discharged offsite into Class II surface impoundments constructed pursuant to Title 27.
2. The discharge of solid geothermal waste to mud sumps/containment basins as a final means of disposal is prohibited without written authorization by the Regional Board Executive Officer.
3. The Discharger shall not cause degradation of any groundwater aquifer or supply water.
4. The discharge of waste to land not owned or controlled by the Discharger is prohibited.
5. Use of geothermal brine or drilling muds for dust control on access roads, well pads, or within the plant area is prohibited.
6. The discharge of hazardous or designated wastes to areas other than a waste management unit authorized to receive such waste is prohibited.
7. Permanent (longer than one (1) year) disposal or storage of drilling waste to mud sumps/containment basins is prohibited, unless authorized in writing by the Regional Board Executive Officer.
8. All mud sumps/containment basins must be lined. Drilling waste shall not penetrate the lining during the containment period.
9. Direct or indirect discharge of geothermal drilling wastes in mud sumps/containment basins or tanks, to surface water or surface drainage courses (including canals, drains, or subsurface drainage systems) is prohibited except as allowed under an appropriate NPDES permit.
10. The Discharger shall neither cause nor contribute to the contamination or pollution of groundwater via the release of waste constituents.

C. Provisions

1. The Discharger shall comply with Monitoring and Reporting Program No. R7-2008-0004 and future revisions thereto, as specified by the Regional Board Executive Officer.

Ormat Nevada, Inc.
North Brawley Geothermal Power Project
Waste Discharge Requirements (Revision 1)

2. Unless otherwise approved by the Regional Board Executive Officer, all analyses shall be conducted at a laboratory certified for such analyses by the California Department of Health Services. All analyses shall be conducted in accordance with the latest edition of "Guidelines Establishing Test Procedures for Analysis of Pollutants", promulgated by the U.S. Environmental Protection Agency.
3. Prior to any change in ownership of this operation, the Discharger shall transmit a copy of this Board Order to the succeeding owner/operator, and forward a copy of the transmittal letter to the Regional Board.
4. Prior to any modification that could result in a material change in the quality or quantity of discharge or material change in the location of the discharge the Discharger shall report all pertinent information in writing to the Regional Board Executive Officer and obtain revised requirements before implementing the modification.
5. All mud sumps/containment basins shall be certified, by a California Registered Civil Engineer or Certified Engineering Geologist to contain a continuous 1-foot-thick clay liner with a hydraulic conductivity of less than or equal to 1×10^{-6} cm/sec, or equivalent system approved by the Regional Board's Executive Officer.
6. The Discharger shall ensure that all site-operating personnel are familiar with the content of this Board Order and shall maintain a copy of this Board Order at the site.
7. This Board Order does not authorize violation of any federal, state, or local laws or regulations.
8. The Discharger shall allow the Regional Board, or an authorized representative, upon presentation of credentials and other documents, as may be required by law, to:
 - a. Enter upon the premises regulated by this Board Order, or the place where records must be kept under the conditions of this Board Order;
 - b. Have access to and copy, at reasonable times, any records that shall be kept under the condition of this Board Order;
 - c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Board Order, and
 - d. Sample or monitor at reasonable times, for the purpose of assuring compliance with this Board Order or as otherwise authorized by the California Water Code, any substances or parameters at this location.
9. The Discharger shall comply with all of the conditions of this Board Order. Any noncompliance with this Board Order constitutes a violation of the Porter-Cologne Water Quality Act and is grounds for enforcement action.

Ormat Nevada, Inc.
North Brawley Geothermal Power Project
Waste Discharge Requirements (Revision 1)

10. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control, and related appurtenances, that are installed or used by the Discharger to achieve compliance with this Board Order. Proper operation and maintenance also includes adequate laboratory controls, and appropriate quality assurance procedures.
11. The Discharger shall comply with the following:
 - a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity;
 - b. The Discharger shall retain records of all monitoring information, copies of all reports required by the Board Order, and records of all data used to complete the application of the Board Order, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by the Regional Board Executive Officer at any time;
 - c. Records of monitoring information shall include:
 - i. The date, exact place(s), and time of sampling or measurement(s).
 - ii. The individual(s) who performed the sampling or measurement(s).
 - iii. The date(s) analyses were performed.
 - iv. The individual(s) responsible for reviewing the analyses.
 - v. The results of such analyses; and
 - d. Monitoring must be conducted according to test procedures described in the Monitoring and Reporting Program, unless other test procedures have been specified in this Board Order or approved by the Regional Board Executive Officer.
12. The Discharger is the responsible party for the WDRs, and the monitoring and reporting program for the Facility. Ormat Nevada Inc. shall comply with all conditions of these WDRs. Violations may result in enforcement action, including Regional Board Orders or court orders, that require corrective action or impose civil monetary liability, or modification or revocation of these WDRs by the Regional Board.
13. The Discharger shall furnish, under penalty of perjury, technical monitoring program reports submitted pursuant to the specifications provided by the Regional Board Executive Officer. Specifications are subject to periodic revision as may be warranted.
14. The monitoring reports shall be certified to be true and correct, and signed, under penalty of perjury, by an authorized official of the company.
15. This Board Order does not convey property rights of any sort, or any exclusive privileges; nor does it authorize injury to private property, invasion of personal rights, or infringement of federal, state, or local laws and regulations.

Ormat Nevada, Inc.
North Brawley Geothermal Power Project
Waste Discharge Requirements (Revision 1)

16. This Board Order may be modified, rescinded, or reissued for cause. The filing of a request by the Discharger to modify, or rescind or reissue a Board Order does not stay any Board Order condition. Likewise, notification of planned changes or anticipated noncompliance does not stay any Board Order condition. Causes for modification include: changes in land application plans, sludge use, or disposal practices; or promulgation of new regulations by the State or Regional Boards, including revisions to the Basin Plan.

I, Robert Perdue, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Colorado River Basin Region, on January 16, 2008.

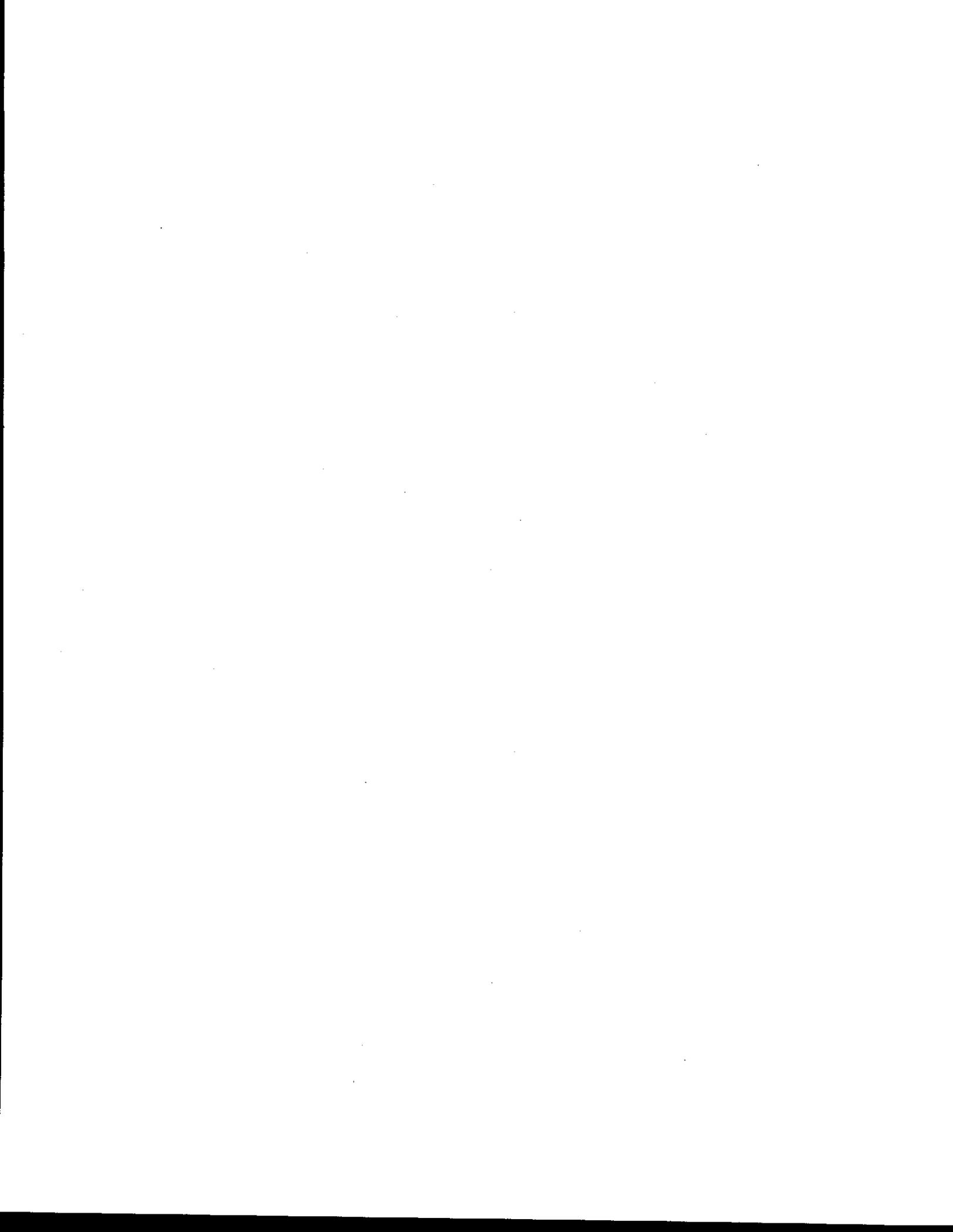
Ordered by:

A handwritten signature in black ink, appearing to read "R. Perdue", written over a horizontal line.

ROBERT PERDUE
Executive Officer



EXHIBIT 39



PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

ENERGY DIVISION

RESOLUTION E-4126
March 13, 2008

REDACTED

R E S O L U T I O N

Resolution E-4126. Southern California Edison Company requests approval of two renewable portfolio standard power purchase agreements between Caithness Dixie Valley, LLC and ORNI #18, LLC. These contracts are approved without modifications.

By Advice Letter (AL) 2137-E filed on July 13, 2007, AL 2137-E-A filed on August 16, 2007 and AL 2137-E-B filed on January 10, 2008

SUMMARY

Southern California Edison's (SCE) renewable energy contracts comply with the Renewable Portfolio Standard (RPS) procurement guidelines and are approved

SCE filed advice letter (AL) 2137-E on July 13, 2007 requesting Commission review and approval of two renewable energy power purchase agreements (PPAs) executed with Caithness Dixie Valley, LLC (Dixie Valley) and ORNI #18, LLC (ORNI 18). SCE filed AL 2137-E-A on August 16, 2007 to supplement, in part, AL 2137-E in order to include the Independent Evaluation Report for SCE's 2006 renewable resource solicitation. SCE filed AL 2137-E-B on January 10, 2008 to supplement, in part, AL 2137-E and AL 2137-E-A to reflect changes to the PPAs made in order to comply with Commission Decision (D.) 07-11-025, "Opinion on Amended Petition for Modification of Decision 04-06-014 Regarding Standard Terms and Conditions", issued November 19, 2007.

Generating facility	Type	Term Years	MW Capacity	GWh Energy	Online Date	Location
Dixie Valley	Geothermal, existing	20	50	394	7/2018	Dixie Valley, NV
ORNI #18	Geothermal, new	20	50-100	416-832	12/2009	North Brawley, CA

The Agreement between Caithness Dixie Valley and SCE is for 20 years of geothermal energy from an existing plant. Currently, SCE receives eligible renewable energy from this facility under an interim standard offer no. 4 (ISO4) contract. The Dixie Valley contract will begin in July 2018, when the ISO4 is set to expire. The ORNI 18 project is for 20 years of geothermal energy from a new facility, expected to be come online in December 2009.

Deliveries from these PPAs are reasonably priced and the contract prices are fully recoverable in rates over the life of the contract, subject to Commission review of SCE's administration of the contracts. Both contract prices are below the 2006 market price referent.

Confidential information about the contract should remain confidential

This resolution finds that certain material filed under seal pursuant to Public Utilities (Pub. Util.) Code Section 583, General Order (G.O.) 66-C, and D.06-06-066 should be kept confidential to ensure that market sensitive data does not influence the behavior of bidders in future RPS solicitations.

BACKGROUND

The RPS Program requires each utility to increase the amount of renewable energy in its portfolio

The California RPS Program was established by Senate Bill 1078, effective January 1, 2003. It requires that a retail seller of electricity such as SCE purchase a certain percentage of electricity generated by Eligible Renewable Energy Resources (ERR). The RPS program is set out at Public Utilities Code Section 399.11, et seq. SB 1078 required each utility to increase its total procurement of ERRs by at least 1% of annual retail sales per year so that 20% of its retail sales would be supplied by ERRs by 2017.

The State's Energy Action Plan (EAP) called for acceleration of this RPS goal to reach 20 percent by 2010. This was reiterated again in the Order Instituting Rulemaking (R.04-04-026) issued on April 28, 2004¹, which encouraged the utilities to procure cost-effective renewable generation in excess of their RPS annual procurement targets² (APTs), in order to make progress towards the goal expressed in the EAP.³ On September 26, 2006, Governor Schwarzenegger signed

¹ http://www.cpuc.ca.gov/Published/Final_decision/36206.htm

² APT - An LSE's APT for a given year is the amount of renewable generation an LSE must procure in order to meet the statutory requirement that it increase its total eligible renewable procurement by at least 1% of retail sales per year.

³ Most recently reaffirmed in D.06-05-039

Senate Bill 107⁴, which officially accelerated the State's RPS targets to 20 percent by 2010.

CPUC has established procurement guidelines for the RPS Program

In response to SB 1078, the Commission has issued a series of decisions that establish the regulatory and transactional parameters of the utility renewables procurement program. On June 19, 2003, the Commission issued its "Order Initiating Implementation of the Senate Bill 1078 Renewable Portfolio Standard Program," D.03-06-071⁵. Instructions for utility evaluation (known as 'least-cost, best-fit') of each offer to sell products requested in a RPS solicitation were provided in D.04-07-029.⁶ The Commission adopted Standard Terms and Conditions for RPS power purchase agreements in D.04-06-014⁷ as required by Public Utilities Code Section 399.14(a)(2)(D). In addition, D.06-10-050, as modified by D.07-03-046, refined the RPS reporting and compliance methodologies.⁸ In this decision, the Commission established methodologies to calculate an LSE's initial baseline procurement amount, annual procurement target (APT) and incremental procurement amount (IPT).⁹

On June 9, 2004, the Commission adopted its market price referent (MPR) methodology¹⁰ as required by Public Utilities Code Sections 399.14(a)(2)(A) and 399.15(c). On December 15, 2005, the Commission adopted D.05-12-042 which refined the MPR methodology for the 2005 RPS Solicitation.¹¹ Subsequent resolutions adopted MPR values for the 2005, 2006 and 2007 RPS Solicitations.¹²

⁴ SB 107, Chapter 464, Statutes of 2006

⁵ http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/27360.PDF

⁶ http://docs.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/38287.PDF

⁷ This decision has subsequently been modified. See next subsection.

⁸ D.06-10-050, Attachment A, http://www.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/61025.PDF) as modified by D.07-03-046 (http://www.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/65833.PDF).

⁹ The IPT represents the amount of RPS-eligible procurement that the LSE must purchase, in a given year, over and above the total amount the LSE was required to procure in the prior year. An LSE's IPT equals at least 1% of the previous year's total retail electrical sales, including power sold to a utility's customers from its DWR contracts.

¹⁰ D.04-06-015; http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/37383.pdf

¹¹ http://www.cpuc.ca.gov/word_pdf/FINAL_DECISION/52178.pdf

¹² Respectively, Resolution E-3980: http://www.cpuc.ca.gov/WORD_PDF/FINAL_RESOLUTION/55465.DOC, Resolution E-4049: http://www.cpuc.ca.gov/word_pdf/FINAL_RESOLUTION/63132.doc,

In addition, the Commission has implemented Pub. Util. Code 399.14(b)(2), which states that before the Commission can approve an RPS contract of less than ten years' duration, the Commission must establish "for each retail seller, minimum quantities of eligible renewable energy resources to be procured either through contracts of at least 10 years' duration (long-term contracts) or from new facilities commencing commercial operations on or after January 1, 2005." On May 3, 2007, the Commission approved D.07-05-028, which established a minimum percentage of the prior year's retail sales (0.25%) that must be procured with contracts of at least 10 years' duration or from new facilities commencing commercial operations on or after January 1, 2005 in order for short-term contracts to be used towards RPS compliance.

Commission requires certain terms and conditions in all RPS power purchase agreements

On June 9, 2004, the Commission adopted standard terms and conditions for RPS power purchase agreements as required by Pub. Util. Code Section 399.14(a)(2)(D). Of the fourteen standard terms and conditions adopted in D.04-06-014¹³, the Commission specified five that could be modified by parties, and nine that may not be modified or only modified in part. Two parties jointly filed a petition for modification on this decision, and subsequently an amended petition for modification. The Commission granted relief in substantial part in D.07-11-025, the "Opinion on Amended Petition for Modification of Decision 04-06-014 Regarding Standard Terms and Conditions".¹⁴

As a result of the D.07-11-025, ten standard terms and conditions are modifiable and four are non-modifiable. The non-modifiable terms and conditions that must be in every RPS power purchase agreement include: CPUC Approval, RECs and Green Attributes, Eligibility and Applicable Law. The Commission also requires that pending advice letters with contracts which have not yet been approved or rejected should be amended to comply with D.07-11-025.

Above-MPR costs can now be recovered in rates

Pursuant to SB 1078 and SB 107, the California Energy Commission (CEC) was authorized to "allocate and award supplemental energy payments" to cover above-market costs¹⁵ of long-term RPS-eligible contracts executed through a

Resolution E-4110:

http://www.cpuc.ca.gov/word_pdf/FINAL_RESOLUTION/73594.pdf

¹³ http://docs.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/37401.PDF

¹⁴ http://docs.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/75354.PDF

¹⁵ "Above-market costs" refers to the portion of the contract price that is greater than the appropriate market price referent (MPR).

competitive solicitation.¹⁶ The statute required that developers seeking above-market costs apply to the CEC for supplemental energy payments (SEPs).

This above-market cost recovery mechanism was reformed on October 14, 2007 when Governor Schwarzenegger signed SB 1036¹⁷, which authorizes the CPUC to provide above-MPR cost recovery through electric retail rates for contracts that are deemed reasonable. Above-MPR cost recovery has a 'cost limitation' equal to the amount of funds currently accrued in the CEC's New Renewable Resources Account, which had been established to collect SEP funds, plus the portion of funds that would have been collected through January 1, 2012. In addition, pursuant to SB 1036, Pub. Util. Code § 399.15(d)(2) provides that:

"The above-market costs of a contract selected by an electrical corporation may be counted toward the cost limitation if all of the following conditions are satisfied:

(A) The contract has been approved by the commission and was selected through a competitive solicitation pursuant to the requirements of subdivision(d) of Section 399.14.

(B) The contract covers a duration of no less than 10 years.

(C) The contracted project is a new or repowered facility commencing commercial operations on or after January 1, 2005.

(D) No purchases of renewable energy credits may be eligible for consideration as an above-market cost.

(E) The above-market costs of a contract do not include any indirect expenses including imbalance energy charges, sale of excess energy, decreased generation from existing resources, or transmission upgrades."

The CEC and CPUC are currently working collaboratively to implement SB 1036, which has an effective date of January 1, 2008.

SCE requests approval of two renewable energy contracts

On July 13, 2007, SCE filed AL 2137-E requesting Commission approval of two renewable power procurement contracts. SCE filed AL 2137-E-A and AL 2137-E-B to supplement, in part, AL 2137-E in order to include the Independent Evaluation Report for SCE's 2006 renewable resource solicitation and to comply with D.07-11-025, adopted on November 19, 2007. The ORNI 18 and Dixie Valley

¹⁶ Pub. Util. Code 399.15(d)

¹⁷ Chapter 685, Statutes of 2007 (SB 1036)

PPAs result from SCE's 2006 solicitation for renewable bids, which was authorized by D.06-05-039.

The Commission's approval of the PPAs will allow SCE to accept future deliveries of renewable resources and contribute towards the renewable energy procurement goals required by California's RPS statute.¹⁸ The proposed Dixie Valley will enable SCE to continue receiving renewable energy deliveries from this facility after the existing ISO4 contract expires in 2018. Procurement from the proposed ORNI 18 project is expected to contribute towards SCE's APT starting in 2009.

SCE requests "CPUC Approval" of PPAs

SCE requests a Commission resolution containing the following findings in order to satisfy the "CPUC Approval" terms in both the Dixie Valley and ORNI 18 Agreements:

1. Approval of the Dixie Valley and ORNI 18 Contracts in their entirety.
2. Approval of the modification of certain terms and condition in the Dixie Valley and ORNI 18 Contracts that are provided for in D.04-06-014¹⁹.
3. A finding that any electric energy sold or dedicated to SCE pursuant to the Dixie Valley and ORNI 18 Contracts constitute procurement by SCE from an eligible renewable resource (ERR) for the purpose of determining SCE's compliance with any obligation that it may have to procure from ERRs pursuant to the RPS Legislation or other applicable law concerning the procurement of electric energy from renewable energy resources.
4. A finding that all procurement under the Dixie Valley and ORNI 18 Contracts count, in full and without condition, towards any annual procurement target established by the RPS Legislation or the Commission which is applicable to SCE.
5. A finding that all procurement under the Dixie Valley and ORNI 18 Contracts count, in full and without condition, towards any incremental procurement target established by the RPS Legislation or the Commission which is applicable to SCE.

¹⁸ California Public Utilities Code section 399.11 et seq., as interpreted by D.03-07-061, the "Order Initiating Implementation of the Senate Bill 1078 Renewables Portfolio Standard Program", and subsequent CPUC decisions in Rulemaking (R.) 04-04-026, R.06-02-012 and R.06-05-027.

¹⁹ SCE requested this list of findings in Al 2137-E. Subsequently, SCE has modified the contract terms and conditions to comply with D.07-11-025, the "Opinion on Amended Petition for Modification of Decision 04-06-014 Regarding Standard Terms and Conditions".

6. A finding that all procurement under the Dixie Valley and ORNI 18 Contracts count, in full and without condition, towards the requirement in the RPS Legislation that SCE procure 20% (or such other percentage as may be established by law) of its retail sales from ERRs by 2010 (or such other date as may be established by law).
7. A finding that the Dixie Valley and ORNI 18 Contracts, and SCE's entry into these PPAs, is reasonable and prudent for all purposes, including, but not limited to, recovery in rates of payments made pursuant to the PPAs, subject only to further review with respect to the reasonableness of SCE's administration of the PPAs.
8. Any other and further relief as the Commission finds just and reasonable.

SCE's Procurement Review Group participated in review of the contracts

In D.02-08-071, the Commission required each utility to establish a "Procurement Review Group" (PRG) whose members, subject to an appropriate non-disclosure agreement, would have the right to consult with the utilities and review the details of:

1. Overall transitional procurement strategy;
2. Proposed procurement processes including, but not limited to, RFO; and
3. Proposed procurement contracts before any of the contracts are submitted to the Commission for expedited review.

SCE's PRG was formed on or around September 10, 2002. Current participants include representatives from the Commission's Energy Division, the Division of Ratepayer Advocates, The Utility Reform Network, the Natural Resources Defense Council, the Consumers' Union, California Utility Employees, and the California Department of Water Resources.

SCE asserts that its PRG was consulted during each step of the renewable procurement process. Among other things, SCE informed the PRG of the initial results of its request for proposals (RFP); explained the evaluation process; and updated the PRG periodically concerning the status of contract formation. On December 19, 2006, SCE advised the PRG of its proposed short-list of bids. On March 13, 2007, SCE updated the PRG as to the status of negotiations with bidders into SCE's 2006 RPS solicitation. On April 11, 2007, SCE briefed the PRG concerning the successful conclusion of discussions with Dixie Valley. On June 27, 2007, SCE briefed the PRG concerning the conclusion of discussions with ORNI 18.

Although Energy Division is a member of the PRG, it reserved its conclusions for review and recommendation on the PPA to the advice letter process.

NOTICE

Notice of AL 2137-E, AL 2137-E-A and AL 2137-E-B were made by publication in the Commission's Daily Calendar. Southern California Edison states that a copies of the Advice Letter were mailed and distributed in accordance with Section III-G of General Order 96-A.

PROTESTS

Advice Letters 2137-E, 2137-E-A and 2137-E-B were not protested.

DISCUSSION

Description of the projects

The following table summarizes the substantive features of the PPAs. See confidential Appendices C-1 and C-2 for detailed discussions of contract prices, terms, and conditions:

Generating facility	Type	Term Years	MW Capacity	GWh Energy	Online Date	Location
Dixie Valley	Geothermal, existing	20	50	394	7/2018	Dixie Valley, NV
ORNI #18	Geothermal, new	20	50-100	416-832	12/2009	North Brawley, CA

PPAs are consistent with SCE's CPUC adopted 2006 RPS Plan

California's RPS statute requires the Commission to review the results of a renewable energy resource solicitation submitted for approval by a utility.²⁰ The Commission will then accept or reject proposed PPAs based on their consistency with the utility's approved renewable procurement plan (Plan). SCE's 2006 Plan includes an assessment of supply and demand for renewable energy and bid solicitation materials, including a pro-forma agreement and bid evaluation methodology documents. The Commission conditionally approved SCE's 2006 RPS procurement plan, including its bid solicitation materials, in D.06-05-039. As ordered by D.06-05-039, on June 9, 2006 SCE filed and served its amended 2006 Plan. After the Director of the Energy Division temporarily suspended SCE's 2006 RPS solicitation and authorized SCE to further amend its 2006 Plan and 2006 RFP, SCE filed an amended 2006 RPS procurement plan and amended

²⁰ Pub. Util. Code, Section §399.14

2006 RFP protocol. In the amended 2006 Plan, SCE made the necessary changes that were required and/or suggested by D.06-05-039. The Proposed PPAs are consistent with SCE's Commission-approved RPS Plan.²¹

PPAs fit with Plan's identified renewable resource needs

SCE's 2006 RPS Plan called for SCE to issue competitive solicitations for electric energy generated by eligible renewable resources from either existing or new generating facilities that would deliver in the near term or long term. SCE also considered any new or repowered facilities that operate on co-fired fuels or a mix of fuels that include fossil fuel hybrid. SCE's 2006 request for proposals (RFP) solicited proposals for projects that would supply electric energy, environmental attributes, capacity attributes and resource adequacy benefits from eligible renewable energy resources. SCE requested proposals based upon standard term lengths of 10, 15 or 20 years with a minimum capacity of 1 MW. SCE indicated a preference to take delivery of the electric energy at SP-15, but considered proposals based upon any designated delivery point within California.

Both the Dixie Valley and ORNI 18 projects fit SCE's identified renewable resource needs. Both projects convey electric energy, environmental attributes, capacity attributes and resource adequacy to SCE. ORNI 18 satisfies both SCE's locational preference and delivery requirements. Additionally, Dixie Valley satisfies SCE's delivery requirements for a facility located outside of California.

PPA selections are consistent with RPS Solicitation Protocol

SCE distributed an RFP package that included a procurement protocol, which set forth the terms and conditions of the RFP, requirements for proposals, selection procedures, approval procedures and the RFP schedule. As part of the bid submission, SCE required bidders to submit comments on SCE's pro-forma agreement, to execute non-disclosure agreements and to send a letter stating that the bidder agrees to be bound by the terms and conditions of the protocol. The protocol also requested that proposals contain complete, accurate, and timely information about the project's supplier, generating facility, and commercial terms and the pricing details of the proposal.

According to SCE, the Dixie Valley and ORNI 18 bids were consistent with SCE's RPS solicitation protocol. Both bids offered power from eligible renewable energy resources, submitted the standard forms, agreed to be bound by the protocol and signed a non-disclosure agreement.

²¹ Modifications to SCE's pro-forma contract terms and conditions were required to comply with D.07-11-025.

Bid evaluation process consistent with Least-Cost Best-Fit (LCBF) decision

The CPUC's LCBF decision²² directs the utilities to use certain criteria in their bid ranking. It offers guidance regarding the process by which the utility ranks bids in order to select or "shortlist" the bids with which it will commence serious negotiations.

SCE's LCBF bid review process used for its 2006 solicitation is in compliance with the applicable Commission decisions. SCE's LCBF analysis evaluates both quantitative and qualitative aspects of each proposal to estimate its value to SCE's customers and relative value in comparison to other proposals.

Quantitative Assessment

SCE quantitatively evaluates bids based on individual benefit-to-cost (B-C) ratios. It is this B-C ratio that is used to rank and compare each project. The B-C ratios measure total benefits divided by total costs according to the following equation:

$$\text{B-C Ratio} = \frac{\text{Capacity Benefit} + \text{Energy Benefit}}{\text{Payments} + \text{Integration Cost} + \text{Transmission Cost} + \text{Debt Equivalence}}$$

The capacity benefits are assigned based on SCE's forecast of capacity value and a technology-specific effective load carrying capability (ELCC). SCE evaluates the project energy benefits using a production simulation model that compares the total production costs of SCE's base resource portfolio with the total production costs of the portfolio including the proposed RPS project. This calculation takes into account forecasted congestion charges, dispatchability and curtailability. This modeling methodology evaluates the impact of portfolio fit for all projects.

The market valuation of each project includes an assessment of the payments, an all-in price for delivered energy adjusted in each time-of-delivery period, and integration costs. By Commission policy (D.04-07-029 and clarified by D.07-02-011), integration cost adders for all proposals must be zero. Further, the transmission upgrade costs are estimated using SCE's transmission ranking cost report for resources that do not have an existing interconnection to the electric system or a completed Facilities Study.

The benefit-to-cost ratios for both the Dixie Valley and ORNI 18 projects were favorable in comparison to the bids in SCE's 2006 solicitations. See Confidential Appendix A for more detailed bid comparisons.

²² D.04-07-029

Independent evaluators (IE) oversaw SCE's RPS procurement process

Consistent with D.06-05-039, SCE retained an independent evaluator (IE), Sedway Consulting, to report to SCE's procurement review group about the 2006 RPS solicitation, to ensure that the solicitation was conducted fairly and to evaluate whether the best resources were acquired. According to the IE Report submitted in AL 2137-E-A, Sedway Consulting performed its duties overseeing the 2006 solicitation and has provided assessment reports to the PRG and the CPUC.

In its Independent Evaluator Report, Sedway Consulting concluded that SCE "conducted a fair and effective evaluation of the proposals that it received in response to its 2006 RPS RFP and made the correct selection decisions in its short list." Sedway Consulting performed its own evaluation of all 2006 proposals using a model developed to simulate SCE's LCBF ranking results. The IE ranked all proposals using its model and compared the results to SCE's bid ranking results. The IE's ranking results were similar to SCE's, and as a result, Sedway Consulting agreed with SCE's shortlisting decisions. In addition, the IE monitored SCE's shortlisting discussions, contract negotiations and meetings with management where SCE made decisions, for example, regarding bid prioritizations and negotiation positions. Overall, the IE concludes that SCE conducted a fair and effective evaluation of its 2006 renewable energy proposals.

For the IE's contract-specific evaluations, see Confidential Appendix E.

Consistency with adopted standard terms and conditions

In D.04-06-014, the Commission set forth standard terms and conditions (STCs) to be incorporated into RPS agreements. Appendix A of that decision identified nine of the fourteen STCs as "may not be modified." On November 19, 2007, after the filing of AL 2137-E and AL 2137-E-A, the Commission decided to grant, in part, an amended petition for modification of D.04-06-014. This decision, D.07-11-025, which granted in part the petition for modification, stated that all renewable power purchase agreements must contain four non-modifiable standard terms and conditions. D.07-11-025 also required that electrical corporations, such as SCE, file amendments to any pending advice letters for renewable PPAs in order to comply with the decision.

SCE filed AL 2137-E-B to supplement, in part, terms and conditions in both the Dixie Valley and ORNI 18 Agreements. As a result, the STCs for both PPAs are in compliance with D.07-11-025.

Contract prices are below 2006 MPR

The levelized contract price for the ORNI 18 contract does not exceed the relevant 2006 MPR. For the Dixie Valley contract, SCE had to modify the 2006 MPR model since it only calculated values for generating facilities with online dates between 2006 and 2015. SCE modified the 2006 MPR model, issued in Resolution E-4049, by extrapolating forward the data available in the 2006 MPR model in order to calculate an MPR for a facility with a 2018 online date. The Energy Division has reviewed the revised MPR model and finds the modifications to be reasonable. Using the modified model, SCE calculated the MPR for a 20-year contract with an online date in 2018 as \$101.95/MWh. Therefore, the levelized contract price for the Dixie Valley contract does not exceed the MPR.²³

As a result, the net present value of the sum of payments to be made under each PPA are less than the net present value of payments that would be made at the market price referent for the anticipated delivery. Therefore, for each contract, the contract price payments are below the MPR and per se reasonable as measured according to the net present value calculations explained in D.04-06-015, D.04-07-029, and D.05-12-042.

PPAs are viable projects

SCE believes that both projects are viable. However, ORNI 18's project viability is affected by the uncertainty surrounding whether the federal production tax credit will be extended past 2008.

Project Milestones

The ORNI 18 PPA identifies the necessary milestones, including permit applications, financing, construction and startup deadlines. Since the Dixie Valley PPA concerns an existing facility, there is no development necessary prior to delivery or any associated milestones.

Financeability of Resource

Both projects have financing in place.

Production Tax Credit

The ORNI 18 project, but not the Dixie Valley project, is contingent upon the extension of the federal production tax credits (PTC) as provided in Section 45 of the Internal Revenue Code of 1986, as amended. The PTC is set to expire

²³ See Confidential Appendix C for a more detailed analysis of the modified MPR model.

December 31, 2008, and ORNI 18's initial online date is December 2009. The PTC has been extended several times in recent history, and there is potential that it will again be extended. However, this poses a project viability concern for the ORNI 18 project since it is uncertain whether the PTC will be extended.

Sponsor's Creditworthiness and Experience

Both developers have been providing SCE with renewable energy for many years. According to SCE, they are both reliable and experienced.

Transmission Upgrades

The Dixie Valley project is operating and has no transmission upgrade issues. The ORNI 18 project will interconnect to the Imperial Irrigation District. While a new substation must be built and transmission upgrade studies are not yet complete, the developer has indicated a low risk that transmission upgrades will delay the project's online date. Initially, the ORNI 18 project will not be scheduled to deliver the energy to SCE's service territory because transmission upgrades are necessary to transmit the energy from IID to SCE's territory. However, because the RPS program allows the RPS-eligible energy to be delivered anywhere in California, SCE can remarket the energy until the necessary transmission upgrades are completed.²⁴

Fuel/Technology

The Dixie Valley project is online and reliably delivering geothermal energy. While the resource has been delivering for nearly 20 years, SCE believes that the geothermal resource will remain viable and will deliver the expected energy throughout the term of the contract.

SCE has reviewed the ORNI 18 resource test well results and spoke with the developer's geotechnical and drilling staff about the potential of the geothermal resource. As a result, SCE believes that the ORNI 18 project's geothermal resource will be able to sustain at least a 50 MW facility, and likely provide adequate supply for a 100 MW facility. Thus, there is an identifiable, yet low, risk that ORNI 18's untapped geothermal resource will affect the project's viability.

Confidential information about the contracts should remain confidential

Certain contract details were filed by SCE under confidential seal. Energy Division recommends that certain material filed under seal pursuant to Public Utilities (Pub. Util.) Code Section 583 and General Order (G.O.) 66-C, and

²⁴ D. 06-05-039, Conclusion of Law #3, allows delivery of RPS-eligible energy anywhere in California.

considered for possible disclosure, should be kept confidential to ensure that market sensitive data does not influence the behavior of bidders in future RPS solicitations.

COMMENTS

Public Utilities Code section 311(g)(1) provides that this resolution must be served on all parties and subject to at least 30 days public review and comment prior to a vote of the Commission. Section 311(g)(2) provides that this 30-day period may be reduced or waived upon the stipulation of all parties in the proceeding.

The 30-day comment period for the draft of this resolution was neither waived nor reduced. Accordingly, this draft resolution was mailed to parties for comments and will be placed on the Commission's agenda no earlier than 30 days from today.

FINDINGS OF FACT

1. The RPS Program requires each utility, including SCE, to increase the amount of renewable energy in its portfolio to 20 percent by 2010, increasing by a minimum of one percent per year.
2. D.04-06-014 set forth standard terms and conditions to be incorporated into RPS power purchase agreements.
3. D.07-11-025 granted an amended petition for modification of D.04-06-014, and set forth four non-modifiable standard terms and conditions to be incorporated into RPS power purchase agreements.
4. D.06-05-039 directed the utilities to issue their 2006 renewable RFOs, consistent with their renewable procurement plans.
5. The Commission required each utility to establish a Procurement Review Group (PRG) to review the utilities' interim procurement needs and strategy, proposed procurement process, and selected contracts.
6. Levelized contract prices below the 2006 MPR are considered *per se* reasonable as measured according to the net present value calculations explained in D.04-06-015, D.04-07-029, and D.05-12-042.
7. SCE filed Advice Letter 2137-E on July 13, 2007, requesting Commission review and approval of two renewable energy contracts with Caithness Dixie Valley and ORNI #18.
8. SCE filed Supplemental Advice Letter 2137-E-A on August 16, 2007 to supplement, in part, AL 2137-E in order to include the Independent Evaluation Report for SCE's 2006 renewable resource solicitation.

9. SCE filed Supplemental Advice Letter 2137-E-B on January 10, 2008 to supplement, in part, AL 2137-E and AL 2137-E-A to amend contract terms and conditions in both Caithness Dixie Valley and ORNI #18 contracts in order to comply with D.07-11-025.
10. SCE briefed its PRG on December 19, 2006 and March 13, 2007 on issues related to its 2006 shortlist and RFO. Also, on April 11, 2007 and June 27, 2007, SCE briefed the PRG concerning the successful conclusion of discussions with Dixie Valley and ORNI #18.
11. The proposed contract price for the ORNI 18 project is below the 2006 MPR released in Resolution E-4049.
12. SCE modified the 2006 MPR model in order to be able to evaluate a contract with a start date in 2018.
13. The Caithness Dixie Valley contract price is below the 2006 MPR modified by SCE.

CONCLUSIONS OF LAW

1. The Commission has reviewed the proposed contracts and finds them to be consistent with SCE's approved 2006 renewable procurement plan.
2. These Agreements are reasonable and should be approved in their entirety.
3. The costs of the contracts between SCE and Sellers are reasonable and in the public interest; accordingly, the payments to be made by SCE are fully recoverable in rates over the life of each project, subject to CPUC review of SCE's administration of the PPAs.
4. Certain material filed under seal pursuant to Public Utilities (Pub. Util.) Code Section 583 and General Order (G.O.) 66-C, and considered for possible disclosure, should not be disclosed. Accordingly, the confidential appendices, marked "[REDACTED]" in the redacted copy, should not be made public upon Commission approval of this resolution.
5. Procurement pursuant to these Agreements is procurement from eligible renewable energy resources for purposes of determining Buyer's compliance with any obligation that it may have to procure eligible renewable energy resources pursuant to the California Renewables Portfolio Standard (Public Utilities Code Section 399.11 *et seq.*), Decision 03-06-071, or other applicable law.
6. All procurement under the Dixie Valley and ORNI #18 Contracts count, in full and without condition, towards any annual procurement target established by the RPS Legislation or the Commission which is applicable to SCE.

Resolution E-4126
SCE AL 2137-E/SMK

7. All procurement under the Dixie Valley and ORNI #18 Contracts count, in full and without condition, towards any incremental procurement target established by the RPS Legislation or the Commission which is applicable to SCE.
8. A finding that all procurement under the Dixie Valley and ORNI #18 Contracts count, in full and without condition, towards the requirement in the RPS Legislation that SCE procure 20% (or such other percentage as may be established by law) of its retail sales from ERRs by 2010 (or such other date as may be established by law).
9. Any indirect costs of renewables procurement identified in Section 399.15(a)(2) shall be recovered in rates.
10. AL 2137-E, Al 2173-E-A and Al 2173-E-B should be approved without modifications.

THEREFORE IT IS ORDERED THAT:

1. Advice Letters (AL) 2137-E, 2137-E-A and 2137-E-B are approved without modifications.
2. The costs of the contracts between SCE and Sellers are reasonable and in the public interest; accordingly, the payments to be made by SCE, at or below the MPR, are fully recoverable in rates over the life of the project, subject to CPUC review of SCE's administration of the PPAs.
3. This Resolution is effective today.

Resolution E-4126
SCE AL 2137-E/SMK

I certify that the foregoing resolution was duly introduced, passed and adopted at a conference of the Public Utilities Commission of the State of California held on March 13, 2008; the following Commissioners voting favorably thereon:

/s/PAUL CLANON
PAUL CLANON
Executive Director

MICHAEL R. PEEVEY
PRESIDENT
DIAN M. GRUENEICH
JOHN A. BOHN
RACHELLE B. CHONG
TIMOTHY ALAN SIMON
Commissioners

Confidential Appendix A
Overview of 2006 Solicitation Bids
[REDACTED]

Confidential Appendix B
LCBF Bid Evaluations
[REDACTED]

Confidential Appendix C-1
Contract Summary: Caithness Dixie Valley
[REDACTED]

Confidential Appendix C-2
Contract Summary: ORNI #18
[REDACTED]

Confidential Appendix E:
Independent Evaluator's
Contract-Specific Assessments
(Dixie Valley and ORNI 18)
[REDACTED]

Confidential Appendix F-1:
Project's Contribution Toward RPS Goals -
Caithness Dixie Valley
[REDACTED]

Confidential Appendix F-2:
Project's Contribution Toward RPS Goals -
ORNI #18
[REDACTED]

EXHIBIT 40

IMPERIAL IRRIGATION DISTRICT
BOARD AGENDA MEMORANDUM

077

TO: Board of Directors
FROM: General Manager
SUBJ: Ormat Water Supply Agreement
DATE: October 7, 2008
DEPT: Water

WD WJK

Action Requested:

Approval of the attached water supply agreement for Ormat's North Brawley geothermal exploration project.

Background:

ORNI 18, LLC, a wholly owned subsidiary of Ormat Nevada, Inc., (Ormat) is currently undertaking development activities for a 49.9 MW geothermal power plant known as the North Brawley geothermal exploration project. Ormat has requested IID supply up to 6,800 acre-feet of water for its operational activities at this facility for a term of 20 years.

Given the substantial increase in the project's demand versus the historical agricultural usage, this agreement requires additional payments in overrun years to offset any new IID costs that might occur as a result of increased usage attributed to this new industrial use. In addition, there is a replacement water condition requiring Ormat to take actions to conserve, import or reduce the project water demands by 20 percent 11 years into the agreement term and a total of 40 percent by year 15. These terms should minimize impacts to the agricultural sector, to the extent possible, given the increased demand.

CEQA documentation and related compliance materials are being provided separately to the board for review and consideration. Copies of this document are also available at IID's Imperial headquarters.

This item was reviewed and discussed by the board at the September 23, 2008 regular meeting.

Water Department staff (Michael L. King, Tina Shields and Sabrina Barber) will be available to answer questions.

Financial Impact:

Ormat water deliveries will be billed at the industrial rate, with a supplemental billing in overrun years for use toward payback requirements. Water sales will be at the industrial rate, along with a \$1.5 million contribution toward IID's upcoming integrated water resources management plan.

Recommendation:

Staff recommends the board adopt the attached resolution, including the CEQA actions specifically noted in order to approve the Ormat water supply agreement as attached.

**IMPERIAL IRRIGATION DISTRICT
RESOLUTION NO. _____-2008**

- A. **WHEREAS**, ORNI 18, LLC, a wholly owned subsidiary of Ormat Nevada, Inc., a Nevada corporation ("ORMAT"), is currently undertaking activities relating to the construction and operation of a 49.9 MW geothermal power plant and related geothermal production and injection wells located within the service area of the IID, Imperial County, California ("Ormat Project");
- B. **WHEREAS**, The site of the power plant is approximately 24 acres ("Plant Site") located within a 240-acre parcel defined as the Southeast corner of Section 17, T.13S.R.14E., of the S.B.B.M. and designated as Assessor's Parcel Number (APN) 037-130-40-01 of which a 216.1 acre (FSA) portion was served historically by Spruce Lateral 1 Gate 66;
- D. **WHEREAS**, The Ormat Project is more specifically described in, and will be constructed and operated by ORMAT in conformance with Conditional Use Permit #07-0017 ("Conditional Use Permit") approved by the County of Imperial ("County") and recorded on November 27, 2007 as Document # 2007-044103 of the Official Records of Imperial County, California;
- E. **WHEREAS**, the IID Board of Directors is willing to make available up to 6,800 acre feet of water per calendar year for beneficial consumptive use by ORMAT in connection with the Plant Site in accordance with the terms and conditions set forth in the proposed IID/ORMAT Water Supply Agreement ("Agreement");
- F. **WHEREAS**, the proposed Agreement authorizes the provision of up to a maximum of 6,800 acre feet per year, an amount that can be met without reducing water available to existing customers, said maximum to be reduced over the 20 year term of the contract upon terms and conditions satisfactory to the IID Board of Directors;
- G. **WHEREAS**, the County, as the lead agency for the Ormat Project pursuant to the California Environmental Quality Act ("CEQA"), California Public Resources Code Sections 21000 et seq., and the CEQA Guidelines, 14 California Code of Regulations Sections 15000 et seq., evaluated the potential environmental effects of the Ormat Project and approved a Mitigated Negative Declaration ("MND") for the Ormat Project in November 2007;
- H. **WHEREAS**, based on its role in approving and executing the Agreement, which will provide a water supply for the Plant Site, IID is a responsible agency under CEQA;
- I. **WHEREAS**, at the direction of the General Manager, IID staff has reviewed the November 2007 MND to determine whether it sufficiently assesses the effects of the Agreement on the environment; to determine whether there are any potential

effects of the Agreement beyond those already assessed in the November 2007 MND and, if so, to assess the significance of such effects; and to determine whether any mitigation measures, in addition to those required by the November 2007 MND, are appropriate to mitigate any such additional potential effects of the Agreement;

- J. **WHEREAS**, IID staff has prepared an Environmental Compliance Report, a copy of which is attached hereto as Attachment A;
- K. **WHEREAS**, the IID Board of Directors, at its regularly scheduled public meeting on October 7, 2008 independently reviewed and considered the analysis provided in the Environmental Compliance Report and all of its attachments, including the November 2007 MND, IID's Comments on the Draft MND, the Conditional Use Permit, and the County's Mitigation Monitoring and Reporting Plan as well as the IID General Manager's recommendations;
- L. **WHEREAS**, all of the findings and conclusions made by the IID Board of Directors pursuant to this Resolution are based upon the oral and written evidence presented to it as a whole and not based solely on the information provided in this Resolution; and
- M. **WHEREAS**, the Board wishes to approve the Environmental Compliance Report, make findings as a responsible agency pursuant to CEQA, and authorize execution of the Agreement.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE IMPERIAL IRRIGATION DISTRICT:

1. The IID Board has determined that the proposed Water Supply Agreement is consistent with existing IID regulations and will not adversely affect existing customers.
2. In order to comply with CEQA:
 - a. The Board has reviewed and considered the Environmental Compliance Report attached to this Resolution as Attachment A.
 - b. The Board finds that: (i) the County's November 2007 Mitigated Negative Declaration adequately addresses the environmental effects of the Plant Site portion of the Ormat Project for IID's use as a responsible agency in approving and executing the Agreement; (ii) the County's November 2007 Mitigated Negative Declaration provides for and requires appropriate mitigation to reduce all potentially significant effects of the Agreement to less than significant; (iii) there are no significant effects from the Agreement that would require findings pursuant to CEQA Guidelines Section 15091; and (iv) the Environmental Compliance Report reflects the Boards' independent judgment and analysis.

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- c. The Board hereby approves and adopts the Environmental Compliance Report.
3. The IID Board hereby approves the proposed Water Supply Agreement between ORMAT and the IID and authorizes the Board President to execute the Water Supply Agreement.
4. The Board of Directors hereby authorizes and directs that a Notice of Determination shall be filed with the Clerk of the County of Imperial within five (5) working days of approval of the Water Supply Agreement.

PASSED APPROVED AND ADOPTED this _____ day of October, 2008.

IMPERIAL IRRIGATION DISTRICT

President

Secretary

ATTACHMENT "A" – Environmental Compliance Report

WATER SUPPLY AGREEMENT

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The parties to this Water Supply Agreement ("Agreement"), entered into this ____ day of _____, 2008 ("Effective Date"), are IMPERIAL IRRIGATION DISTRICT, a California irrigation district (hereinafter referred to as "IID"), and ORNI 18, LLC, a wholly owned subsidiary of Ormat Nevada, Inc., a Delaware corporation (hereinafter referred to as "ORMAT").

1. INTRODUCTION:

1.1. ORMAT is currently undertaking development activities precedent to the construction and operation of a 49.9 MW geothermal power plant (hereinafter referred to as the "Project") located within the service area of the IID, Imperial County, California. The site of the proposed Project is approximately 24 acres ("Project Site") located within a 240-acre parcel defined as the Southeast corner of Section 17, T.13S.R.14E., of the S.B.B.M. and designated as Assessor's Parcel Number (APN) 037-130-40-01 of which a 216.1 acre (FSA) portion was served historically by Spruce Lateral 1 Gate 66.

1.2. The Project is more specifically described in, and will be constructed and operated by ORMAT in conformance with, Conditional Use Permit #07-0017 ("Conditional Use Permit") approved by the County of Imperial and recorded on November 27, 2007 as Document # 2007-044103 of the Official Records of Imperial County, California.

1.3. The County, as lead agency, assessed the environmental effects of the Project pursuant to the California Environmental Quality Act ("CEQA"), California Public Resources Code Sections 21000 et seq., and the CEQA Guidelines, 14 California Code of Regulations Sections 15000 et seq., and the County approved a Mitigated Negative Declaration ("MND") for the Project in November 2007.

1.4. The Board of Directors of the IID ("IID Board") is willing to make available up to 6,800 acre of water per calendar year for beneficial consumptive use by ORMAT in connection with the Project in accordance with the terms and conditions set forth in this Agreement.

1.5. This Agreement shall be contingent and effective upon: (i) approval by the IID Board of the Environmental Compliance Report and its findings prepared by IID dated September 22, 2008, (ii) approval by the IID Board of this Agreement, and (iii) execution of this Agreement by the parties.

2. DEFINITIONS:

For the purposes of this Agreement, except as otherwise expressly provided or unless the context otherwise requires, the following terms shall have the following meanings:

- 2.1. **Aggregate Requirement** – With respect to any given calendar year, a volume of water consisting of the aggregate of (i) the Historical Use Amount and (ii) the Replacement Water volume.
- 2.2. **Effective Date** – The date on which the conditions described in Section 1.5 have been satisfied.
- 2.3. **Equitable Distribution Plan** – The Equitable Distribution Plan approved by the IID Board and the Regulations relating thereto, or any additional or superseding regulations approved by the IID Board providing for a system of water allocation, as the same may be amended and in effect from time to time during the Term of this Agreement.
- 2.4. **Excess Requirement** – With respect to any given calendar year, the volume of water consumed by ORMAT for the Project for such year (i) greater than the Historical Use Amount but (ii) less than the Aggregate Requirement applicable to such year.
- 2.5. **Historical Use Amount** – A volume of water determined annually based on an average agricultural historical use rate of 5.7 acre-feet/acre per calendar year for the Project Site of up to 24 acres that is converted from agricultural to industrial use as a result of the project. The Historical Use Amount shall not exceed 137 acre-feet per calendar year and is subject to the terms of Section 8.1 including assignment of the right to receive water service from the landowner as described in Section 8.1.
- 2.6. **Imported Water** – A volume of water from a source other than IID's Colorado River entitlement brought into the IID conveyance system to satisfy all or a portion of the Project's Maximum Use Amount (as defined in Section 2.7) during the Term of this Agreement (as defined in Section 5). Any non-IID water introduced into the IID conveyance system shall be of comparable quality to that of existing Colorado River supplies, subject to IID approval, and require the execution of a separate delivery agreement with IID. IID's approval shall be subject to: (i) compliance with CEQA and all other governmental laws, ordinances, rules and regulations ("Laws") applicable to the provision of such Imported Water, and (ii) issuance of all governmental permits and approvals ("Permits") required therefore. ORMAT shall pay all costs of compliance with such Laws, issuance of such Permits, and satisfaction of all conditions and requirements attached thereto.
- 2.7. **Maximum Use Amount** – The maximum volume of water to be delivered by IID during any calendar year during the Term of this Agreement, which shall be used by ORMAT for the Project. The Maximum Use Amount shall be 6,800 acre-feet reduced by the amount of Replacement Water which ORMAT is required to provide for the applicable calendar year, as set forth on Exhibit A attached hereto and made a part hereof.

- 2.8. **Overrun Year** – A calendar year in which IID's diversions from the Colorado River trigger a payback requirement by the U.S. Department of Interior under its adopted Inadvertent Overrun and Payback Policy.
- 2.9. **Replacement Water** – A volume of water to be provided by ORMAT, at its sole cost, for use in connection with the Project at the Project Site, commencing with the eleventh (11th) calendar year of the Term and continuing for the balance of the Term of this Agreement, as indicated on Exhibit A, which amount shall reduce the amount of water required to be supplied by IID for such years. This water shall be provided by ORMAT from Imported Water, or by a reduction in the Project's water demand, or by measures implemented or funded by ORMAT within the District which conserve Colorado River water, subject to IID approval and outside the conservation measures identified and anticipated for the existing IID water conservation and transfer obligations, in an amount equal to the required Replacement Amount. The provision of any Replacement Water created by measures implemented by Ormat within the District is subject to IID approval, may require the execution of a separate delivery agreement with IID, and is subject to: (i) compliance with CEQA and all other governmental laws, ordinances, rules and (ii) issuance of all governmental permits and approvals ("Permits") required therefore. ORMAT shall pay all costs of compliance with such Laws, issuance of such Permits, and satisfaction of all conditions and requirements attached thereto.

3. **DELIVERY:**

- 3.1. IID shall permit ORMAT to take delivery from the Spruce Canal or another location where otherwise agreed to in writing by the parties, such water as may be required by ORMAT for use in and incidental to the operation of the Project, and for no other purpose, in a total quantity not to exceed 6,800 acre-feet in any calendar year during the Term of this Agreement; provided, however, nothing in this Agreement shall be construed to require IID to modify or enlarge its existing canal system to make water available to ORMAT, and ORMAT shall not be entitled to take water at a rate which will deplete the supply available in the canal for other uses. ORMAT shall order water, up to the Maximum Use Amount, in accordance with IID's Rules and Regulations for ordering water, as amended as of the date of ordering, in compliance with Sections 6 and 8 below. The right of ORMAT to use water for the Project hereunder is not cumulative from year to year during the Term; that is, if ORMAT does not use the full Maximum Use Amount in any calendar year, ORMAT has no right to add the unused amount to the Maximum Use Amount in any succeeding calendar year. Any unused portion of the Maximum Use Amount for any calendar year may be used by IID as it, in its sole discretion, shall determine.
- 3.2. Pursuant to IID Regulation No. 13, ORMAT is required to construct a facility to hold water of a minimum volume equal to six days (based on 24 hours) of use in accordance with the District policy of six-day canal cutouts for maintenance and construction. IID hereby agrees that as an alternative ORMAT shall have the

option to construct an extension of the existing delivery pipeline to the Westside Main Canal in lieu of constructing the on-site storage facility described in IID Regulation No. 13, subject to the following terms and conditions: (i) ORMAT shall deliver written notice to IID of whether it chooses to build the on-site storage facility or the extension of the existing delivery pipeline; (ii) ORMAT shall pay all costs of compliance with applicable Laws in connection with whichever structure is chosen, including CEQA compliance, issuance of all required Permits, and satisfaction of all conditions and requirements attached thereto; (iii) ORMAT, at its sole cost, shall construct, install, and maintain any structures, facilities or improvements necessary to store water in the storage facility or, if the extension of the existing delivery pipeline is chosen, any structures, facilities or improvements necessary to implement its retrieval of water from the Westside Main Canal, including a water metering device acceptable to IID at the connection with the canal that is annually calibrated and certified; and (iv) ORMAT shall complete construction of said storage facility or extension of the existing delivery pipeline and related facilities no later than 3 years from the Effective Date of this Agreement. IID may, without cost to IID, assist ORMAT to obtain any necessary easements, Permits or other rights to transport said water from the West Side Main canal to the Project and ORMAT may terminate this Agreement if it cannot reasonably obtain such Permits. ORMAT acknowledges and assumes all risks of water supply shortages, outages or use limitations due to operation and maintenance activities by IID, capacity limitations, or other infrastructure or field conditions that on-site storage or extension of the existing delivery pipeline to the West Side Main canal may have eliminated or reduced.

- 3.3. To the extent that IID receives an order or directive from a governmental authority having appropriate jurisdiction, reducing the volume of water available to IID from the Colorado River during all or any part of the Term of this Agreement, IID may reduce the Maximum Use Amount, as directed by the IID Board; provided however that in no event shall the ratio of (i) such reduction in the Maximum Use Amount to (ii) the total reduction of water available to IID from the Colorado River exceed the ratio of (a) the Maximum Use Amount to (b) the current total amount of water available to IID from the Colorado River for the otherwise applicable year during implementation of the Quantification Settlement Agreement and Related Agreements, as such available water is summarized on Exhibit B to the Colorado River Water Delivery Agreement among the IID, the United States Secretary of the Interior, and others. This reduction shall be separate from and in addition to any allocation authorized pursuant to the Equitable Distribution Plan.
- 3.4. If IID implements a water allocation program pursuant to the Equitable Distribution Plan during all or any part of the Term of this Agreement, IID shall have the right to apportion ORMAT's water as an Industrial User consistent with the Equitable Distribution Plan.

- 3.5. ORMAT understands and acknowledges that this Agreement does not require, and shall not be construed to require, IID to deliver any specific volume of water for the Project after termination of this Agreement.
- 3.6. During the Term of this Agreement, ORMAT shall implement Best Management Practices (BMPs), conservation measures or new technologies to reduce the Project's water demand from IID. The Replacement Water required in Section 3.7 may be provided, in whole or in part, by implementation of these BMPs and/or conservation technologies in connection with the Project at the Project Site.
- 3.7. During the Term of this Agreement, ORMAT shall provide Replacement Water in the amounts specified in Exhibit A for the applicable calendar year, which shall reduce the Project's water demand from IID for that year. ORMAT shall create Replacement Water by measures approved by IID and outside the conservation measures identified and anticipated for the existing IID water conservation and transfer obligations, in accordance with the schedule shown in Exhibit A. The requirement for ORMAT to provide Replacement Water during the Term of this Agreement will be delayed if water conservation projects are not identified through the Integrated Water Resources Management Plan by IID. Either party may request a status review of this Agreement annually.
4. DRAINAGE RIGHTS:
- 4.1. ORMAT has represented to IID that the Project will be designed as a zero discharge system and as a result ORMAT will not need drainage services that are typically provided to IID's industrial customers. ORMAT may be allowed to discharge, from time to time, occasional rain or storm water runoff to the appropriate IID drainage facility in accordance with IID Rules & Regulations.
- 4.2. Any discharge water shall be regulated by the Regional Water Quality Control Board (RWQCB). ORMAT shall comply with all NPDES and permitting requirements as necessary, including the implementation of appropriate BMPs.
- 4.3. A copy of all discharge records required under any RWQCB discharge permit shall also be submitted to the IID at the interval stated on the permit.
5. TERM:
- 5.1. The term of this Agreement ("Term") shall commence on the Effective Date and, unless sooner terminated as provided in this Agreement, shall terminate December 31, 2028.
- 5.2. In approving this Agreement, IID has relied upon the representation by ORMAT that the Project will be constructed and operated in conformance with the Conditional Use Permit described in Section 1.3. If the Conditional Use Permit is

terminated, or materially modified without IID's approval, this Agreement shall terminate.

6. REQUIREMENTS NOTICE:

- 6.1. ORMAT shall estimate the total quantity of water to be purchased by ORMAT on an annual basis, to reflect the anticipated water requirements for the Project. ORMAT shall, on or before September 1 of each year, provide IID with written notice of the approximate quantity of water to be purchased during each month of the following calendar year ("Quantity Notice Letter"). Such amount shall constitute a good faith estimate on the part of ORMAT, but shall not constitute a minimum or maximum quantity of water to be purchased during the specified period, except as provided in Section 6.2 below.
- 6.2. If IID has authorized implementation of a water allocation process in accordance with the Equitable Distribution Plan for any calendar year, then ORMAT shall be obligated to pay for the Maximum Use Amount during such calendar year. ORMAT shall provide IID with timely written notice on or before January 31 of each year if it intends to use less than the Maximum Use Amount to be delivered by IID for that year pursuant to Exhibit A. During such calendar year if so notified IID will limit water deliveries to the Project to this lesser volume, and ORMAT shall be billed for this revised volume.

7. PAYMENT/BILLING:

7.1. For the right to take and use water identified herein:

- 7.1.1. ORMAT shall pay a per acre-foot charge for water used by the Project at IID's industrial water rate, as amended from time to time, payable monthly.
- 7.1.2. In any Overrun Year, for water consumption above the Historical Use Amount per calendar year, ORMAT shall also be required to pay additional fees associated with its prorata share of IID's total cost to provide water for payback purposes, or obtain Imported Water in an equivalent volume to satisfy payback requirements. ORMAT's prorata share shall be based on its annual water use in the Overrun Year and shall not exceed ORMAT's Project's Excess Requirement or IID's total payback requirement for the Overrun Year. IID will issue a supplemental billing the year following the overrun year based on the projected cost of conservation measures to be implemented to generate conserved water for payback of an overrun.
- 7.1.3. In lieu of the obligation to fund payback obligations in Overrun Years for consumptive use above the Historical Use Amount pursuant to Section 7.1.2, ORMAT may utilize Imported Water to serve the consumptive use demands of the Project.

- 7.1.4. As additional consideration to IID, ORMAT shall pay to IID the amount of One Million Five Hundred Thousand Dollars (\$1,500,000), which Seven Hundred Fifty Thousand Dollars (\$750,000) shall be due and payable within thirty (30) days of the execution of this Agreement and prior to initial delivery of water to the Project with the balance due one (1) year from contract execution. IID shall use these monies to fund IID's upcoming Integrated Water Resources Management Plan (IWRMP) and implementation of any plan components as approved by the IID Board.
- 7.1.5. In the event that IID implements an allocation consistent with the Equitable Distribution Plan during all or any part of the Term of this Agreement, ORMAT shall make payments according to a schedule consistent with the Equitable Distribution Plan. In the event that IID adopts a rate schedule for industrial users in years that an allocation is triggered (consistent with the Equitable Distribution Plan), this Equitable Distribution rate schedule shall supersede IID's usual industrial rate and reflect costs of the assured water supply.
8. COMPLIANCE WITH LAWS, RULES AND REGULATIONS:
- 8.1. ORMAT shall be obligated to comply with the "Rules and Regulations Governing the Distribution and Use of Water" and the Equitable Distribution Plan (collectively, "Rules and Regulations") adopted by IID Board in their present form or as they may be amended hereafter. Prior to ordering any water in accordance with this Agreement, and continuing thereafter during the Term of this Agreement, ORMAT shall provide written authorization from the property owner to allow ORMAT to order water for the Project Site, in accordance with IID's standard procedure. Notwithstanding ORMAT's obligation to comply with said Rules and Regulations, in the event of any conflict or inconsistency between the provisions of this Agreement and said Rules and Regulations pertaining to ORMAT's payment obligation set forth in Section 7 of this Agreement, this Agreement shall govern.
- 8.2. ORMAT shall obtain and maintain in effect during the Term of this Agreement, all Permits required for construction and operation of the Project. ORMAT shall comply with all Laws applicable to the Project and the terms and conditions of all Permits.
9. GOVERNING LAW:
- 9.1. This Agreement shall be interpreted in accordance with the substantive and procedural laws of the State of California. All actions or proceedings arising in connection with this Agreement shall be tried and litigated exclusively in State court located in the County of Imperial, State of California and/or Federal court located in the County of San Diego or County of Imperial, State of California. The aforementioned choice of venue is mandatory, thereby precluding the possibility

of litigation between the parties with respect to or arising out of this Agreement in any jurisdiction other than that specified in this paragraph. Each party hereby waives any right it may have to assert the doctrine of forum non conveniencce or a similar doctrine or to object to venue with respect to any proceeding brought in accordance with this paragraph, and stipulates that the State and Federal courts located in the Counties of Imperial and San Diego, respectively, California, shall have in personam jurisdiction and venue over each of them for the purpose of litigating any dispute or proceeding arising out of or related to this Agreement. Each party hereby authorizes service of process sufficient for personal jurisdiction in any action against it at the address and in the manner for the giving of notice as set forth in this Agreement.

10. BINDING OBLIGATIONS: ASSIGNMENT:

- 10.1. This Agreement shall be binding upon and inure to the benefit of the parties and their successors and assigns, subject to the limitations set forth in this Section 10. No party may assign or transfer its rights or obligations under this Agreement without the prior written consent of the other party hereto, except as permitted herein. Such consent shall not be unreasonably withheld. However, without prior consent, IID may assign its rights under this Agreement as security for any water conservation financing IID might obtain in carrying out this Agreement. ORMAT may, without prior consent, assign its rights to a lender, lessor, and/or trustee acting on behalf of a lender or lessor, or any other financing entity which acquires an interest in the Project (collectively "Financing Entities") in connection with any financing involving the Project. In the event of an assignment of ORMAT's rights hereunder to any Financing Entities, IID shall take such further actions and execute such documents as are reasonably requested by such Financing Entities to effectuate such assignment, provided that such agreement does not materially, adversely affect IID's rights and obligations hereunder.

Solely with respect to any Financing Entity which acquires an interest in this Agreement, and provided IID has received written notice from ORMAT of such interest and request, IID agrees to give written notice to such Financing Entity of any default by ORMAT under this Agreement and will afford such Financing Entities a reasonable period of time to commence appropriate action to cure such default, should they choose to do so; provided, however, that any monetary default by ORMAT must be cured by such Financing Entity within thirty (30) days after expiration of the sixty (60) day cure period available to ORMAT under Section 16.1(a) and shall include late payments and penalties as described in Section 15.1. In the event that this Agreement is terminated by reason of bankruptcy of any party, IID will, at the option of any Financing Entity, enter into a new contract with such Financing Entities or their successors or assigns, having terms similar to this Agreement.

Except for the assignment to a Financing Entity for security purposes described above, ORMAT may only assign its rights under this Agreement to an entity which:

(i) is the assignee of ORMAT's rights under the Conditional Use Permit described in Section 1.2; (ii) owns fee title to, or a leasehold interest in, the Project Site; and (iii) has been authorized by the property owner to order water for the Project in accordance with IID's standard procedures. No such assignment shall be effective until the delivery to IID of a written document providing for the assignment of ORMAT's rights under this Agreement, the assignee's assumption, for the benefit of IID, of ORMAT's obligations under this Agreement, and representations by the assignee comparable to those by ORMAT in Section 21.

11. NO THIRD PARTY RIGHTS:

11.1. Except as provided in Section 10, the parties do not intend to create rights and/or to grant remedies to any third party or others as a beneficiary of this Agreement or of any duty, covenant, obligation or undertaking established hereunder.

12. NO DEDICATION OF FACILITIES:

12.1. Any undertaking by one party to another party under any provision of this Agreement shall not constitute the dedication of the system or any portion thereof of the party to the public or to the other party, and it is understood and agreed that any such undertaking under any provision of this Agreement by a party shall cease upon the termination of its obligations hereunder.

13. NON-WAIVER:

13.1. None of the provisions of this Agreement shall be considered waived by any party except when such waiver is given in writing. The failure of any party to insist in anyone or more instances upon strict performance of any of the provisions of this Agreement or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provisions or their relinquishment of any such rights for the future, but the same shall continue and remain in full force and effect.

14. UNCONTROLLABLE FORCES:

14.1. No party shall be considered to be in default in the performance of any of its obligations under this Agreement when a failure of performance shall be due to an uncontrollable force. The term "Uncontrollable Force" shall mean any cause beyond the control of the party affected including, but not restricted to, flood, drought, earthquake, tomado, storm, fire, pestilence, lightning and any other natural catastrophe, epidemic, war, riot, civil disturbance or disobedience, strike, labor dispute, labor or material shortage, sabotage, acts, including restraining or enjoinder by proper authority, of civil or military authority (whether valid or invalid), inaction or non-action by or inability to obtain or keep the necessary authorizations or approvals from any governmental agency or authority, which by

exercise of due diligence such party could not reasonably have been expected to avoid and which by exercise of due diligence it has been unable to overcome; provided, however, that uncontrollable forces shall not include financial inability or economic conditions generally. Nothing contained herein shall be construed as to require a party to settle any strike or labor dispute in which it may be involved. Any party rendered unable to fulfill any of its obligations under this Agreement by reason of uncontrollable force shall give prompt written notice of such fact to the other parties and shall exercise due diligence, and cooperate with any efforts of such other parties, to remove such inability with all reasonable dispatch

15. LATE PAYMENT PENALTY:

15.1. If ORMAT (solely with respect to the payments under Sections 7.1.1, 7.1.2, and 7.1.5) fails to pay any amount when due, an interest charge on the unpaid amount due based on the late payment charge percentage calculated by the Department of the Treasury and published quarterly in the Federal Register (but not less than 0.5% per month) shall be added on the first day following the due date and monthly thereafter until the payment, any penalty and interest are paid in full. Additionally, if any payment is not made within seven (7) business days after written notice is received by ORMAT, that such payment is overdue, a penalty of two percent (2%) of the amount due shall be added thereto. IID's remedies under this Section 15.1 shall be in addition to any remedies available to IID under Section 16 below.

16. TERMINATION:

- 16.1. If ORMAT breaches this Agreement, including failure to make payment when due or to provide Replacement Water as outlined in Exhibit A, IID shall have the following rights and remedies:
- (a) If delivery charges for water used by the Project, or any other monetary amounts payable by ORMAT hereunder, are not paid within sixty (60) days after written notice is received by ORMAT and any Financing Entities (identified by notice to IID as described in Section 10.1), IID may suspend deliveries of water pursuant to this Agreement with respect to such Project, and such Project shall have no further rights to use water hereunder until and unless such default (plus penalty and interest) is fully cured within an additional six months. After such 6-month period, IID may terminate this Agreement with respect to such Project if such default is still outstanding. IID shall deliver written notice to ORMAT of its election to suspend deliveries and/or terminate this Agreement.
 - (b) IID may charge penalties and interest only in accordance with paragraph 16 above.

(c) In the event of a non-monetary default by ORMAT, or if any representation by ORMAT becomes false or materially misleading, IID may terminate this Agreement by written notice to ORMAT; provided, however, that IID has delivered written notice to ORMAT and any Financing Entities (identified by notice to IID as described in Section 10.1), and the default remains uncured after expiration of a thirty (30) day cure period, except that if the default is curable and reasonably requires additional time to cure, the cure period shall be extended for such reasonable time as long as ORMAT commences the cure within such 30-day period and diligently prosecutes such cure to completion thereafter.

(d) IID may institute any available and appropriate legal or equitable action to enforce the terms of this Agreement.

16.2. IID may use any or all of these rights and remedies in case of ORMAT's breach and if it selects one, shall not waive its right to select or use any other. IID acknowledges (and will accept) that any Financing Entities or other parties which acquire an interest in the Project may cure any breach of this Agreement within the time periods specified in Section 10.1 and 16.1, as applicable, and such cure shall be considered as full performance hereunder.

17. INDEMNIFICATION:

17.1. To the fullest extent permitted by law, ORMAT shall defend, indemnify and hold harmless IID, its employees, agents and officials, from any: liability; claims; suits or actions (including alternative dispute resolution); losses; expenses; fees; or costs of any kind, whether actual, alleged or threatened; administrative, and regulatory proceedings; and any other costs or expenses of any kind whatsoever without restriction or limitation; so long as such things are in relation to, as a consequence of, arising out of, or in any way attributable actually, allegedly or implied, in whole or in part, to the performance of this Agreement and/or the construction and operation by ORMAT of any facilities for the delivery of water to the Project. All obligations under this provision are to be paid by ORMAT as they are incurred by IID.

Without affecting the rights of IID under any provision of this Agreement or this section, ORMAT shall not be required to indemnify and hold harmless IID as set forth above for liability attributable to the sole fault of IID, provided such sole fault is determined by agreement between the parties or the findings of a court of competent jurisdiction. This exception will apply only in instances where IID is shown to have been solely at fault and not in instances where ORMAT is partially at fault or in instances where the fault of IID accounts for only a percentage of the liability involved. In those instances, the obligation of ORMAT will be all inclusive and IID will be indemnified for all liability incurred, even though a percentage of the liability is attributable to conduct of IID.

ORMAT acknowledges that its obligation pursuant to this section extends to liability attributable to IID, if the liability is less than the sole fault of IID. However,

ORMAT has no obligation under this Agreement for liability proven in a court of competent jurisdiction or by written agreement between the parties to be the sole fault of IID.

The obligations of ORMAT under this or any other provision of this Agreement will not be limited by the provisions of any workers compensation act or similar act. ORMAT expressly waives its statutory immunity under such statutes or laws as to IID, its employees and officials.

ORMAT agrees to this indemnity provision and represents that it has been given an opportunity to take exception to all or any part of this, as well as all other provisions of the Agreement.

- 17.2. In the event of any legal action or proceeding instituted by a third party (i.e., neither IID nor ORMAT) challenging the validity and enforceability of this Agreement, the Project, or the CEQA compliance for this Agreement or the Project, the parties shall cooperate with each other in good faith to defend such action or proceeding; provided, however, that ORMAT shall indemnify, hold harmless and pay all reasonable costs for the defense of IID, including reasonable fees and costs for legal counsel regarding any such action or proceeding.

18. ATTORNEYS FEES AND COSTS:

- 18.1. If either party to this Agreement shall bring any action, claim, appeal, or alternative dispute resolution proceedings, for any relief against the other, declaratory or otherwise, to enforce the terms of or to declare rights under this Agreement (collectively, an Action), the losing party shall pay to the prevailing party a reasonable sum for attorneys' fees and costs incurred in bringing and prosecuting such Action and/or enforcing any judgment, order, ruling, or award (collectively, a Decision) granted therein. Any Decision entered in such Action shall provide for the recovery of attorneys' fees and costs incurred in enforcing such Decision. The court or arbitrator may fix the amount of reasonable attorneys' fees and costs on the request of either party. For the purposes of this paragraph, attorneys' fees shall include, without limitation, fees incurred in the following: (1) post-judgment motions and collection actions; (2) contempt proceedings; (3) garnishment, levy, and debtor and third party examinations; (4) discovery; and (5) bankruptcy litigation. "Prevailing party" within the meaning of this paragraph includes, without limitation, a party who agrees to dismiss an Action on the other party's payment of the sums allegedly due or performance of the covenants allegedly breached, or who obtains substantially the relief it seeks.

19. NOTICES:

19.1. All notices, requests, demands and other communications required or permitted under this Agreement shall be in writing and shall be deemed to have been received when delivered or faxed or on the fifth business day following the mailing, by registered or certified mail, postage prepaid, return receipt requested, thereof address as set forth below:

If to IID:

IMPERIAL IRRIGATION DISTRICT
Attention: General Manager
P.O. Box 937
333 E. Barioni Blvd.
Imperial, CA 92251

and

IMPERIAL IRRIGATION DISTRICT
Attention: Water Manager
P.O. Box 937
333 E. Barioni Blvd.
Imperial, CA 92251

If to ORMAT:

General Manager
ORMAT
947 Dogwood Road
Heber, CA 92249

With a copy to:

ORMAT NEVADA, Inc.
6225 Neil Road
Reno, NV 89511

Any party may change the addressee or address to which communications or copies are to be sent by giving notice of such change of addressee or address in conformity with the provisions of this paragraph for the giving notice.

20. AMENDMENT OR TERMINATION

20.1. This Agreement may be amended, in whole or in part, or terminated only by a written document executed by both parties.

21. ORMAT REPRESENTATIONS AND WARRANTIES.

- 21.1. ORMAT is a corporation duly organized and validly existing in good standing under the laws of the State of Delaware, and has all requisite power and authority to enter into and perform its obligations hereunder. The execution, delivery and performance by ORMAT of this Agreement has been duly authorized by all necessary action on the part of ORMAT and does not require any approval or consent of any holder (or any trustee for any holder) of any indebtedness or other obligation of ORMAT. This Agreement has been duly executed and delivered on behalf of ORMAT by the appropriate officers of ORMAT and constitutes the legal, valid and binding obligation of ORMAT, enforceable against ORMAT in accordance with its terms.
- 21.2. ORMAT holds a leasehold interest in the Project Site which allows ORMAT to occupy and use the Project Site for construction and operation of the Project, and ORMAT holds the rights to construct and operate the Project under the Conditional Use Permit.

22. INTEGRATION

- 22.1. This Agreement between ORMAT and IID and all attachments hereto, as well as any other documents referred to in this Agreement, constitute the entire Agreement between the parties with regard to the subject matter hereof and thereof. This Agreement supersedes all previous agreements between or among the parties. There are no other agreements, representations, or warranties between or among the parties other than those set forth in the documents identified above.

23. ENVIRONMENTAL COMPLIANCE AND MITIGATION.

- 23.1. ORMAT shall be responsible to ensure and fund all necessary efforts to comply with all environmental laws, including but not limited to CEQA, associated with the Project and the provision of water to the Project under this Agreement.
- 23.2. ORMAT shall be responsible to ensure and fund the implementation of necessary environmental mitigation required under all environmental laws, including but not limited to CEQA, associated with the Project and the provision of water under this Agreement.

24. Geothermal Mitigation.

- 24.1 ORMAT shall participate in the Imperial County Subsidence Detection Program and provide IID with all reports and findings. ORMAT shall provide IID with annual monitoring reports which shall be supplemented with defined benchmark/elevation locations to ascertain movement of IID's system. All costs will be funded by ORMAT.

24.2. In the event that geothermal induced ground movement from any and/or all ORMAT facility operations have impacted IID facilities, ORMAT shall be responsible for all costs involved in quantifying and mitigating said impacts to IID facilities such that a level of function at least equal to their function prior to operation of the various geothermal facilities is achieved.

IN WITNESS WHEREOF, ORMAT and IID have caused this Agreement to be executed and effective as of the Effective Date first above written.

IMPERIAL IRRIGATION DISTRICT

Date _____

By _____
President

Date _____

ATTEST: _____
Secretary

ORMAT, INC.

Date _____

By _____

EXHIBIT A

WATER DELIVERY AND REPLACEMENT WATER SCHEDULE
(Acre-Foot/Year)

Contract	Calendar	Maximum	Replacement	Maximum
Year	Year	Delivery	Water Provided	Use
		Volume	by Ormat	Amount
1	2009	6,800	0	6,800
2	2010	6,800	0	6,800
3	2011	6,800	0	6,800
4	2012	6,800	0	6,800
5	2013	6,800	0	6,800
6	2014	6,800	0	6,800
7	2015	6,800	0	6,800
8	2016	6,800	0	6,800
9	2017	6,800	0	6,800
10	2018	6,800	0	6,800
11	2019	6,800	1,360	5,440
12	2020	6,800	1,360	5,440
13	2021	6,800	1,360	5,440
14	2022	6,800	1,360	5,440
15	2023	6,800	2,720	4,080
16	2024	6,800	2,720	4,080
17	2025	6,800	2,720	4,080
18	2026	6,800	2,720	4,080
19	2027	6,800	2,720	4,080
20	2028	6,800	2,720	4,080

EXHIBIT 41

IMPERIAL IRRIGATION DISTRICT
W. R. CONDIT AUDITORIUM
1285 BROADWAY AVENUE
EL CENTRO, CA 92243



REGULAR MEETING: TUESDAY, OCTOBER 7, 2008

DIRECTORS PRESENT

Division 1 - Mike Abatti
Division 2 - John Pierre Menvielle, *President*
Division 3 - Jim Hanks, *Vice President*
Division 4 - Stella Mendoza,
Division 5 - Anthony Sanchez

MEETING CALLED TO ORDER – 10 a.m.

The board convened in open session at 10 a.m. There being no public comments, it reconvened in closed session.

CLOSED SESSION

The board met in closed session to review with legal counsel several lawsuits or issues of potential litigation.

OPEN SESSION – 1 p.m.

Pastor Richard Moore of the First Southern Baptist Church in Holtville, said the invocation and Tony Ramos led the audience in the Pledge of Allegiance.

PRESENTATIONS

The president and general manager recognized Eric Grubaugh as employee of the month and the emergency operation center group as team of the month for October, 2008.

PUBLIC COMMENTS

El Centro resident Cliff Hurley provided comments on the equitable distribution program. Concerning the financial outlook issue on the agenda today, he asked why if water sales are up, the revenue is down by \$3.5 million? This raises a red flag in his mind.

Mike Morgan, Brawley resident, recalled the conversation at last night's equitable distribution workshop about the software acquired to carry out the equitable distribution program, TruePoint, and the problems the Water Department is having with it. He reminded the board about the offer by a group of farmers to let IID use a system for free that would do all the things needed to carry out the water apportionment program. TruePoint cannot do apportionment to farm units without some modifications. Mr. Morgan asked the board to revisit its decision; the group of farmers is still happy to assist the district at no cost.

Orbia Hanks from Brawley asked if there was another Local Entity group that farm service providers could submit information to, and IID's legal counsel, Jeff Garber, indicated that the committee in existence had been disbanded as the settlement with IID had been completed. The board has not made a decision on who will be disbursing future funds for socioeconomic impacts. The financial report shows that as of May 29, 2008, there was \$8.4 million in the Local Entity fund. Mr. Hanks also asked questions concerning the district's long-term debt. He said that at the beginning of 2008, it was \$800 million and then another \$250 million bond was issued. This places the debt at over \$1 billion. It would take a \$3/acre-foot increase to pay it off in 10 years or an additional \$100/month for energy consumers for seven years. He also wanted to confirm a rumor about General Manager Brady's residence in the Imperial Valley. Dr. Brady responded that he has a place in Brawley and has registered to vote in the county.

Brawley resident Mike Cox complimented Dr. Brady on the appointment of an interim Energy Department manager and the reassignment of duties within the department (which is the first information matter on the agenda today). He added that the financial report is ominous. The Energy Department has gone from having a balance of \$36 million at the end of 2007 to \$7 million projected for the end of 2008. Fuel and purchased power expenses are \$30 million over budget. He believes this is a continuing outcome from the 2006 hedging program and not having a full-time risk manager and the proper employees in place in the Energy Department. He went on to say that a new Supply & Trading group is urgently needed. He is supportive of Dr. Brady and added that the development of the 2009 budget is critical.

El Centro resident Tony Ramos asked if there was a response to his request from the last meeting of having a sign with the motto *In God We Trust* placed in the auditorium. General counsel Garber stated that IID had taken action to include an invocation on each of the regular meeting agendas and there has been discussion concerning Mr. Ramos' request; however, his recommendation is that the board keep to the invocation only and he cited the issue of separation of church and governmental activities. President John Pierre Menvielle said that the invocation is said by a representative from different denominations and the Pledge of Allegiance is recited; that should be sufficient.

Matt Dessert from El Centro and a current member of the Energy Consumers Advisory Committee commented on the district's current financial situation and said that some of its debt could be the result of the aforementioned hedging program. He also added that there's a lack of trust as the district moves forward with a new general manager and management and mentioned the number of consultants that have been hired. Concerning an ECA rate, he said it has to be evaluated if the board is considering a rate increase.

Director Anthony Sanchez stated that his philosophy is to use the reserves during times of economic crisis and not raise rates this year. Will rates be raised next year? Probably since the cash reserves would have been depleted. The number he has heard that rates need to be increased is 4 percent.

Rod Foster, Brawley, had asked at the equitable distribution workshop last night about the new term that was brought up (*common land unit*) and was told by Dr. Eckhardt that the corners of all the fields were shot by GPS and the information was used to get actual acreage. However, his staff got information from the Web site that indicates it is actually gathered by aerial photography with a 90 percent reliability, which is not close enough. He feels he was lied to by a consultant paid by IID, and so was the board.

Cliff Hurley commented on the fact that in 1983 it was moved by Director Moore, seconded by Director Condit, that the budgets approved be balanced and rates be set accordingly. The board has not done so since then, he said.

COMMENTS BY:

BOARD MEMBERS • GENERAL MANAGER • GENERAL COUNSEL

Director Jim Hanks reported that on September 24 he had attended the first meeting of the finance strategic objective; a lot of the discussion centered on defining metrics and enforcement of the budget.

He also read a statement that is paraphrased below:

"As everyone now knows the economy of the United States is in serious jeopardy. The financial institutions, even with the bailout, have been dealt a serious blow that could take anywhere from one to three years to recover. This erosion of our financial institutions will have serious impacts on individuals, companies, institutions and agencies by limiting the amount of cash for borrowing. Following the rules of supply and demand, if the cash supply is limited and demand is constant, the cost of cash should increase. This increase in the cost of capital will minimize the amount of construction that is financed through borrowing, which may affect the IID in many ways. As previously identified in the 2008-2009 budget, the IID has deferred the needed 2008 capital projects until 2009. This means if staff is accurate about the necessity of the projects, the 2009 budget will be loaded with capital projects that should not be further deferred. However, if construction of projects from the outside--the developers or agencies--is also slowed then the necessity for construction may also decrease. This will help but the IID must take care to examine all the factors regarding its long-term health, including real (not perceived) growth, a realistic capital program, a cost of short-term commercial paper and long-term bonds versus funding within its rate structure and possible strategic partnerships.

"Recently the IID has been financing many of its capital programs through the issuance of debt. If you couple that fact with the recent problems, we have drawn down IID capital reserves to dangerous levels, then it is reasonable to assume that future capital projects will need to be financed through higher cost-debt or rate increase. Increasing the rate and financing during hard times is not something that any board member wishes to do. But unless an acceptable financial recovery

plan is put in place, it may be necessary. Regarding this, I have requested this issue be discussed at this board meeting. Hopefully the issue will look at trends to IID debt, its growth, its cash reserves, its capital programs, O&M expenditures versus its rates and available supply of money within a financially strapped economy."

Director Mike Abatti asked General Manager Brady to find out if TruePoint needs help to expedite a solution to the problem it's experiencing in order to have the system ready to go for the equitable distribution project. He then read a statement, which is paraphrased below:

"In March of this year I raised the red flag concerning the under-collection of revenues versus expenses that we're accruing due to the ECA to pay for the fuel and purchased power. At the time the board wanted to reexamine the ECA's fixed rate status and determine if it should be released according to the IID's adopted rate schedule. After many discussions with staff the board decided to keep the rate fixed but also raised it from 4¢ to 5¢ per kilowatt hour in order to increase the revenues generated in the amount represented to the board to be sufficient enough to properly collect for variable expenditures in fuel and purchase power. In July this year I heard that the ECA again was under-collecting revenues so I asked Dr. Brady about this. His response was yes, we're under-collecting about \$20 million to date. But this was an expected amount and was well-within budget, he said. Dr. Brady told the board that this under-collection was not a reason to be alarmed and that we would keep an eye on it. And he further stated a reason for the under-collection was fuel prices had risen significantly higher but were expected to come down. Fuel prices did come down but not to the point where the IID could realize the savings necessary to offset the deficit, which continues to grow. Presently the IID is under-collecting the ECA about \$3 or \$4 million per month. This under-collection has put the IID's financial health at risk and the board needs to address this situation immediately and to do so in such a way that the condition never happens again.

"Management not bringing this information to us in a timely manner has prevented this board from reacting to the under-collection sooner, which is now forcing us to deal with this while the entire world deals with the economy. As I stated in July the result of the under-collection will become more evident by diminishing cash reserves and the probability of a cross-subsidization of cash from capital to pay for fuel and purchased power and critical infrastructure that does not get funded. It is either that or a dramatic rate increase, which will come at a time when our customers cannot afford the increase. No matter, this board will examine the issue and make appropriate decisions to keep the IID afloat. With that said I believe the first step to the recovery process is to release the ECA from its present fixed amount so it can recover the full fuel and purchased power costs. The ECA mechanism worked for years, usually in a variable formula for recovering costs

and it will work again. I'm calling on the board to add this to the next agenda as an item to be voted on.

"Secondly, as far as the organization, I'm asking that the board provide some oversight to necessary organizational changes utilizing local people in key positions whenever possible, and to have the Imperial and Coachella valleys' best interests at heart and not outside contractors or contract employees using this company as a short-term stepping stone. If the skill sets of local people need to be enhanced, then we need to provide sufficient training for them so that the IID is run for the most part by local people loyal to the valley who insure seamless, timely and truthful information flow to the board and to the public so that this situation never happens again."

General Manager Brian Brady:

- (1) Reported on his meeting, along with Frank Barbera, with representatives of the Federal Energy Regulatory Commission and technical staff in Washington, D.C. last week. Discussion focused on contracts with the California Independent System Operator and how best to protect IID's investment in joint transmission projects. A conference to further this discussion will be held next week.
- (2) Attended the basin states meeting last Thursday with Michael King.

INFORMATION ITEMS

No. 1
Realignment of
management
assignments

General Manager Brady informed the board that he has removed himself as acting Energy Department manager. As he had committed to the board, he has taken a hard look at the Energy Department and its needs, and has hired Edward Aghjayan, a highly talented energy consultant to act as the interim Energy Department manager. Mr. Aghjayan has many years of experience in the public utility industry and has managed electric utilities in Texas, Washington and several in California. Dr. Brady looks to him to make an immediate contribution to the IID during his six months on board. A recruitment process will begin immediately to fill the job with a permanent manager.

Dr. Brady also announced that Belen Valenzuela, formerly heading the Supply & Trading Section, has been named interim energy risk manager under the purview of the Finance Department.

Finance Department consultants Mike Bell and Greg Broeking will also be assisting Mr. Aghjayan during his time with the district, Dr. Brady added. These two consultants were instrumental in getting the \$250 million bond issue, which was started a year and a half ago, to completion in a little over five weeks.

No. 1 contd

With these people on board, Dr. Brady feels that the district will be in a better position to deal with the many fiscal and managerial challenges it faces in the year ahead. A commitment has been made to develop a budget that the board can approve and to provide the board with the necessary information on whatever rate restructuring is needed on a timely basis so it can make its decisions before the end of the year.

No. 2
Prop. 218
process

The board had requested a presentation by general counsel on Proposition 218. Jeff Garber indicated that he had been invited by COLAB and the Imperial Valley Vegetable Growers Association to make a presentation to its members. It's the same presentation that was made to the board in May. One of the issues that has come up is whether Mr. Garber has obtained a second opinion and he reported that he has contacted Best, Best & Krieger and asked the firm to review his research product. He also indicated that he would be bringing proposed regulations to the board for adoption as soon as possible. He added that, based on the cost-of-service study, the board has to review rates, but he wants to put the board in a better position to do so. President Menvielle asked if the consultant would make the presentation and Mr. Garber responded that no, the consultant has only been asked to check Mr. Garber's research and the outcome of that review would be brought to the board and the public by Mr. Garber. However, if the board desired a presentation by the consultant, it can be arranged. President Menvielle asked Mr. Garber to provide an update on this issue at the October 21, 2008 meeting.

Ayron Moiola with COLAB disagreed that Proposition 218 is "a bad deal." Instead, it provides an opportunity for the board to partner with its ratepayers to get things done.

No. 3
IID financial
outlook

Finance Department consultants Mike Bell and Greg Broeking briefed the board on impacts to IID's 2009 budget due to financial markets, rate implications and timelines.

Mr. Bell indicated that budget requests have been received from the various departments and the figures are way out of balance. It will take considerable effort to get the budget to a reasonable level. The Energy Department submitted a budget 15 percent above last year's document; capital projects are 35 percent higher. The Water Department figures are much better; O&M is up 8 percent and capital is down (due to the All-American Canal project). The plan is to bring the 2009 budget and any rate implications to the board in December.

No. 3 contd

Mr. Bell added that financial markets are essentially frozen and it's impossible to issue any short-term debt, no matter what rating you have. Banks are not lending to one another. IID is fortunate that it has \$40 million Water Department commercial paper that matures on Friday. This debt will be retired then, but the instrument will be kept in place in case funding is needed in the future. However, IID does not have enough funds to pay down another \$15 million note that matures on October 24. Mr. Bell noted that San Diego is funding 100 percent of the ongoing cash needs for the water transfer.

Energy Department capital projects depend on short-term borrowing; however, it is not in a position to do so until the end of 2009.

Mr. Broeking told the board that it looks as if a rate increase will be needed in both the Water and Energy departments for several reasons. Bond determination cash levels are not where they should be, especially for the Energy Department. IID has to maintain certain debt service coverage if it expects to borrow in the future. Purchase of fuel is \$30 million over budget. The gas market has been creeping up compared to historical numbers. There's a projected need for an increase in the Energy Department of 5-10 percent for 2009.

Mr. Broeking said that the Water Department financial outlook is better because of the trust lands. The sales need to continue to keep the debt service coverage ratio. This has almost mitigated the need for a rate increase and when all the land is sold, there will not be an income stream coming in. Water Department might have to raise rates from \$1 to \$3 an acre-foot.

Staff is still awaiting the results of the cost-of-service study for each of the classes. The goal is to bring the results to the board in December. The recommendation is to have discussions about the budget and possible rate increases during the December board meetings.

To a question from Director Hanks, Mr. Broeking answered that the issue of the energy cost adjustment rate needs to be addressed at the time a rate structure recommendation comes before the board in December. No changes should be made until that time.

Director Hanks' concern is cash flow and whether there is enough to carry IID through the end of the year and the answer was that the reserves will be low, but there's sufficient cash to finish the year.

No. 3 contd

Director Sanchez, who is not in agreement with allowing the ECA to float unless it is part of a broader restructuring of energy rates, said that IID should continue to give cost relief to the ratepayers until the end of the year. If the board floats the ECA, then a huge public outreach should be considered providing information on what ratepayers would be expected to pay during the summer months.

Director Abatti stated that IID cannot continue borrowing money without raising rates. And Director Mendoza indicated that the board has to make a hard decision.

Director Hanks has been looking at this issue for the last two years and getting the necessary information has been frustrating for him. He hopes "our house is in order." He mentioned that the board never received information on the purchased power contracts and asked the new interim Energy Department manager, Mr. Aghjayan, and the other Energy consultants to review those contracts and provide a report to the board. He is of the opinion that areas have been identified where money was left on the table.

Larry Cox, Brawley, asked if the land sale revenues were used for O&M purposes and the answer was that those monies are placed in a restricted account and will be used to pay off the bonds secured for the purchase of the lands.

No. 4
Water gen.
matters

Water Department Manager Michael King reported:

- (1) Water use is down about 4,000 acre-feet from last year's usage during the same time period.
- (2) The deadline to submit requests for proposal on the integrated resource plan was September 30; only two submittals were received and the responses will be evaluated by staff this coming Monday, followed by interviews with the two consultants October 15-16.
- (3) Attended the seven basin states meeting at the MWD offices in Los Angeles, along with General Manager Brady. He reported on the various issues discussed at that meeting. An important matter is the Bureau of Reclamation's desire to develop two treaty minutes.
- (4) There will be a groundbreaking ceremony for the Drop 2 storage reservoir project at 10 a.m., Tuesday, October 21, 2008. Secretary of the Interior Dirk Kempthorne will attend. Since some of the directors were interested in attending this ceremony, it was agreed that the closed session for the 21st would be held after the regular meeting.

No. 4 contd

- (5) Regarding the All-American Canal safety measures brought up to the board by Dr. John Hunter, the San Diego Water County Authority reviewed them at its September board meeting and offered the following recommendations: San Diego (a) will work with Rep. Duncan Hunter's office to construct a safety fence on the south side of the canal; (b) will coordinate with IID to develop an educational outreach to deter people from going in the canal; (c) needs more time to review the suggestions to string buoys across the canal at certain intervals or to decrease the space between the ladders on the concrete section.

Director Abatti read into the record two letters concerning the AAC lining project; one from Rep. Duncan Hunter dated July 30, 2008 and the other from Rep. Bob Filner dated August 25, 2008.

- (6) Regarding the AAC pipelining project, there was a sheet-piling failure but it did not have an impact on IID operations, nor was it caused by IID water levels. However, IID has hired its own forensic expert out of Arizona to determine why the failure occurred. The expert fees will be paid by San Diego.
- (7) A draft of the water cost-of-service study was reviewed by staff last week. The 2008 budget numbers used will be revised to reflect new numbers and the suggestion by some farmers of introducing weekend rates will be added.

No. 5
Energy
gen. matters

General Manager Brady indicated that in response to comments made by IID employee Robin Cruz during the September 23 regular meeting, he had requested a report on material and equipment shortages and found out that over the last four years, the material fill-rate has been estimated at 70 percent, which is attributed to increased national demand and accelerated residential and commercial growth within the district's energy service area. However, IID has developed strategic alliances with transformer manufacturers and other material suppliers so that right now, the fill-rate is 98 percent. As such, the problem has been corrected.

Director Abatti asked if the fill-rate had also caused the inventory to go down and staff indicated it hopes to reduce inventory by using the alliance partnerships. Inventory is down to \$19 million from a previous \$23 million.

No. 6
Interconnection
Hudson Ranch

Energy Department staff reviewed with the board a request by Hudson Ranch Power I, LLC, for a generator interconnection agreement to wheel 55 MW through IID's transmission system to Salt River Project loads. The request will be processed through its open access transmission tariff. Total benefit to IID is \$1.2 million per year in wheeling revenues from the recipient of the load. Staff indicated that IID is exposed to liquidated damages if it does not meet the project in-service date of July 1, 2010, but the board was assured that the project will be completed by that date.

Director Mendoza asked for a quarterly update on this matter.

President Menvielle asked for a copy of the projects in the queue for Karen Williams.

To a question from Director Abatti on the KN/KS line, employee Juan Carlos Sandoval indicated that this would be an informational item at the next meeting.

No. 7
Transmission
Salt River
Project

Energy Department staff also reviewed the request from Salt River Project for a transmission service agreement to acquire 55 MW of capacity from the Hudson Ranch Power 1 geothermal facility (point of receipt) to the Blythe Substation (point of delivery) and wheel that load through IID's transmission system. The applicable transmission rate is \$1.2 million per year. This agreement is for 30 years.

CONSENT AGENDA

No. 8
Approval of
minutes

Moved by Director Mendoza, seconded by Director Abatti, that the board approve the minutes of September 16 (information) and September 23, 2008 (regular) meetings of the Imperial Irrigation District Board of Directors. Motion carried 5-0.

No. 9
Legal services

Director Hanks asked to place the legal services audit on the action agenda.

No. 10
Expense repts

Moved by Director Mendoza, seconded by Director Abatti, that the board acknowledge receipt of the expense reports submitted by several directors. Motion carried 5-0.

No. 11
Smart
program

Moved by Director Mendoza, seconded by Director Abatti, that the board continue its support of the Farm Smart program at the University of California Desert Research and Extension Center for 2008-09 in the amount of \$50,000. Motion carried 5-0.

No. 12
Quitclaim
Deeds

Moved by Director Mendoza, seconded by Director Abatti, that the board approve and authorize the president and secretary to execute a quitclaim deed granting the Coachella Valley Unified School District that easement affecting a portion of Section 17, T. 10 S, R. 10 E., SB&M, county of Imperial, state of California (instrument No. 2007-024289 recorded June 14, 2007). Motion carried 5-0.

Moved by Director Mendoza, seconded by Director Abatti, that the board approve and authorize the president and secretary to execute a quitclaim deed granting to Stamko Development an easement affecting Lot B. Section 20. T. 5 S., R. 8 E., SB&M. county of Riverside, state of California. Motion carried 5-0.

No. 13
Salvage
auction

Moved by Director Mendoza, seconded by Director Abatti, that the board approve and authorize staff to hold a vehicle and equipment salvage auction on November 3, 2008. Motion carried 5-0.

ACTION AGENDA

No. 14
Ormat water
supply
agreement

This issue of a water supply contract for Ormat was reviewed and discussed with the board at its September 23 regular meeting.

At that time Water Department staff told the board that the water supply contract for the Ormat North Brawley geothermal plant was for a 20-year period and requires a maximum of 6,800 acre-feet of water.

One of the guiding principles of this contract is the concept of replacement water beginning in year 11. The long-term goal is to have a new industrial contract that will have no net impact on the existing agricultural sector. Ormat would be charged the current industrial rate, subject to the equitable distribution program and existing rules and regulations, along with a supplemental billing during overrun years that will be used toward payback requirements. Ormat has also committed to providing \$1.5 million in the first year to develop the district's integrated water resource plan to identify new water sources that will be available to it and others.

Director Abatti commented that 6,800 acre-feet for a 40-acre parcel is 30 times more than what would be allowed to a farming unit. He is afraid that this constitutes a water transfer. He supports the plant but the development of water should be new water and not taken away from agriculture. Director Mendoza argued that this is not a water transfer, and Director Hanks stated that, "We don't have to pit one industry against the other. We are working on an integrated resource plan that will look at water that can be recaptured." He also

No. 14 contd

challenged Ormat to look at other designs and technology. He added that this is the time for planning. Director Sanchez also voiced the fact that it is not the intent of this board to take anything from agriculture. And IID does try to capture its system losses; IID is 80-85 percent efficient on the water side, he said.

Andy Horne, with the county of Imperial, mentioned that both the county and IID need to address some of the issues that came up during the permitting process through better coordination between the two entities. If IID doesn't have a policy in place, Director Abatti responded, then one should be developed.

Bob Sullivan, Ormat project manager, told the board that his company is committed to developing replacement water and moving the process along.

Moved by Director Mendoza, seconded by Director Hanks, that the board adopt **Resolution No. 20-2008** resolving the following:

1. The IID board has determined that the proposed water supply agreement is consistent with existing IID regulations and will not adversely affect existing customers.
2. In order to comply with CEQA:
 - a. The board has reviewed and considered the environmental compliance report attached to the resolution as Attachment A.
 - b. The board finds that: (1) the county's November 2007 mitigated negative declaration adequately addresses the environmental effects of the plant site portion of the Ormat project for IID's use as a responsible agency in approving and executing the agreement; (2) the county's November 2007 mitigated negative declaration provides for and requires appropriate mitigation to reduce all potentially significant effects of the agreement to less than significant; (3) there are no significant effects from the agreement that would require findings pursuant to CEQA guidelines Section 15091; and (4) the environmental compliance report reflects the boards' independent judgment and analysis.
 - c. The board hereby approves and adopts the environmental compliance report.
3. The IID board hereby approves the proposed water supply agreement between ORMAT and IID and authorizes the board president to execute the water supply agreement.

- No. 14 contd 4. The Board of Directors hereby authorizes and directs that a notice of determination shall be filed with the clerk of the county of Imperial within five working days of approval of the water supply agreement.

Motion carried 4-1, with Director Abatti voting no.

- No. 15
Richard
Ferreira
agreement
- Moved by Director Abatti, seconded by Director Mendoza, that the board approve Amendment No. 6 to Service Agreement No. 8100000648 with Richard Ferreira, Inc. in the amount of \$75,000 bringing the total for this service agreement to \$624,000. Mr. Ferreira continues to assist Energy Department staff in complying with FERC and WECC requirements/mandates and developing mitigation plans to address areas of non-compliance. Motion carried 5-0.

Director Hanks asked for a board presentation by Mr. Ferreira in the near future.

- No. 16
Financial report
July 2008
- Finance Department consultant Greg Broeking told the board that the Water Department forecast for the end of 2008 is a net loss of \$3.5 million (or \$1.9 million when the trust lands sales are excluded) and \$12.2 million on the Energy side. Fuel and purchased power is over-budget by \$30 million. The centralized services budget is forecasted to be \$4.6 million over-budget.

Moved by Director Mendoza, seconded by Director Hanks, that the board accept the financial report for July 31, 2008 provided by the Finance Department and as presented by consultant Greg Broeking. Motion carried 5-0.

CONSENT ITEMS ADDED TO ACTION AGENDA

- No. 9
Legal services
audit
- Internal Auditor Craig Gottlieb reviewed an audit report on legal services from December 16, 2003 to present. Mr. Gottlieb commended the legal department for always being under-budget. General counsel agreed with the six recommendations and will make sure they are carried out.

Moved by Director Hanks, seconded by Director Mendoza, that the board accept the report prepared by the Internal Auditing Section on legal services, asked the auditors to bring back recommended changes and requested quarterly reports on this issue. Motion carried 5-0.

ADJOURN – 4:55 p.m.

EXHIBIT 42

From: Shahab Khoshmashrab
To: Ken Celli
CC: Chris Davis; Jeffery Ogata; Jennifer Martin-Gallardo; Matthew Layton;...
Date: 8/8/2011 11:28 AM
Subject: Fwd: re: Ormat Imperial Valley Geothermal Projects

Ken,

Just to clarify, my earlier message (below) about CD4 and M1 not being jurisdictional refers to the Mammoth Lake projects, not the North and East Brawley projects.

Shahab

DOCKET	
11-CAI-02	
DATE	<u> AUG 08 2011 </u>
RECD.	<u> AUG 09 2011 </u>

>>> Shahab Khoshmashrab 8/8/2011 8:55 AM >>>
Bob,

CD4 and M1 are not jurisdictional. According to their responses to our letter, on May 31, 2011, each project will be less than 50 MW and will not share any facilities or well.

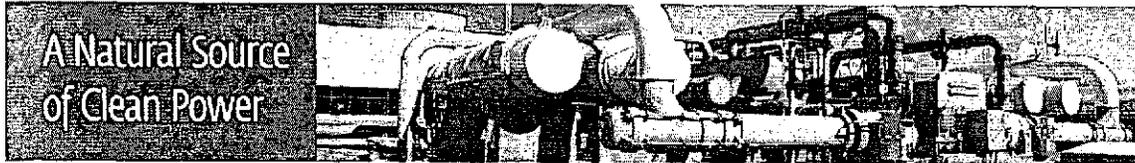
The contact and address I have on file is:
 Ms. Charlene Wardlow
 Director Business Development
 ORMAT Nevada
 6225 Neil Road
 Reno, NV 89511

Shahab

>>> Robert Worl 8/5/2011 4:41 PM >>>
 Attached is the letter written to Ormat requesting that they complete our engineering office's assessment questionnaire regarding their projects (Mammoth Pacific, L.P.s (MPLP) M 1 and CD-4 geothermal projects. I don't believe that Shahab has received the responses from them as of yet. Charlene Wardlow, Director Business Development for Ormat is the appropriate contact for the company. I will check with Shahab on Monday to see if we have any additional information.

bobw

EXHIBIT 43



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Wed May 11, 2011
PROJECT STATUS REPORT

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VANCOUVER, B.C. (May 11, 2011) – Nevada Geothermal Power Inc. (NGP) (TSX-V: NGP, OTC-BB: NGLPF) is pleased to update the status of on-going work.

Nevada Geothermal Power is a leading geothermal developer focused on geothermal power development in the US for continued growth. World events, including political instability in Middle East oil producing regions and the tragic nuclear power plant failure in Japan provide renewed impetus for the U.S. Government plan to encourage the construction of clean, renewable power plants, the development of new clean energy technology and the strengthening of the power grid to bring new power to market. At present, the U.S. is the largest producer of geothermal power in the world with over 3000 MW of geothermal power capacity on line, 1600 MW of new geothermal capacity under development and over 5000 MW of identified geothermal resources for potential future development (Geothermal Energy Association, 2011).

NGP operates the 49.5 MW Faulkner 1 power plant at the Blue Mountain Geothermal Project, Humboldt County, Nevada. Near term growth is planned to come from development of the Crump Geysers (Oregon) and Pumpnickel (Nevada) properties, as well as project acquisitions in Imperial Valley (California) from Iceland America Energy, Inc. (IAE).

NGP has sufficient cash reserves to enable further development of its plans through 2011. The Company is well advanced in its program to acquire three new geothermal properties in the Imperial Valley from IAE and in its resource development in a joint venture at Crump Geysers with Ormat Nevada Inc. The Company is also planning to further pay down mezzanine debt related to the Faulkner 1 plant.

The economics of the Faulkner 1 geothermal plant continue to be adversely affected by lower than anticipated power production and a forecasted gradual temperature decline. The Company is currently further stimulating and testing five wells, as well as re-modeling the reservoir to update its forecast of power production. The Company presently believes the most reasonable power production forecast is 35 MW (net) declining approximately 2.5% per year. If there is no improvement in this forecast the Company will not be able to meet the terms of its loan with EIG Global Energy Partners (EIG), formerly the Trust Company of the West (TCW), and accordingly, in addition to applying for a federal government cash grant and assessing a tax-assisted financing, the Company has begun discussions with EIG in order to make changes to the capital structure.

The current balance on the EIG loan is approximately \$88 million. NGP anticipates repaying a portion of the debt with proceeds of approximately \$7.5 million from a potential tax grant based on additional \$25 million of qualified well field expenditures since the plant was placed in service. In addition, NGP will explore its strategic options and has engaged Marathon Capital to assist with the structuring and potential placement of a \$30-50 million tax-assisted financing. The financing requires reaching an agreement with EIG on new terms that include some conversion of debt to Faulkner 1 Holdco equity, or similar adjustments, as well as receiving a satisfactory updated resource report from independent consultants, GeothermEx Inc., upon the completion of current well tests.

The Company is advancing the following development projects:

Blue Mountain, Nevada

Plant production has been steadily improved to current levels of 35-37 MW (net) or 46-48 MW (gross) output by additional well field drilling since October 2009 when the plant was placed in service. Seven full-sized geothermal wells were completed under the supplemental drilling program, and four have been connected to the Faulkner 1 power

plant. Three of these wells (55-15, 58-11, and 91-15) are in operation as injection wells and a fourth well (44-14) is connected to the plant and has been used intermittently for both production and injection since its completion. The remaining wells (41-27, 34-23, 86-22) located southwest of the production area showed marginal permeability associated with a weak thermal zone and are not connected to the plant at this time. Wells 34-23 and 86-22, along with previously-drilled, sub-commercial production test wells 38-14, 89-11, and 44-14, are being stimulated by cold water injection and oil field fracturing techniques in an attempt to improve injection capacity/production capacity. Test results will be incorporated into an updated reservoir report needed to support the tax-assisted financing referred to above.

NGP plans to continue with exploration drilling of the "Western" and "South Blue Mountain" geothermal target areas.

Iceland America Asset Purchase, Imperial Valley, California

Imperial Valley is a premier address for geothermal development in the US with 500 MW of power capacity on line. Active new power development projects include the 50 MW Hudson Ranch Project which is under construction and the 50 MW Orita Project where Ram Power has released encouraging results from two deep development test wells.

The agreement to purchase the New Truckhaven, East Brawley and South Brawley high temperature geothermal projects is progressing and is expected to close shortly. NGP believes that commercial reservoirs may be present at the New Truckhaven and the East Brawley Projects based on extensive past work including development test drilling in both areas. Iceland America's East Brawley leases are centered on a large heat anomaly immediately south of current drilling by Ram at the Orita Project.

NGP project planning has been initiated so that development permit work and infrastructure studies can commence expeditiously after the acquisition is complete.

Crump Geyser, Oregon

Crump Geothermal Company (CGC), a joint venture between Nevada Geothermal Power and Ormat Nevada, Inc., completed and tested a 5000-foot deep exploration well (34-3) at the Crump Geyser property at a location along the range front to the south of Crump Geyser. A shallow thermal outflow zone not suitable for production was intersected; however, results indicate the well can be used for injection. Planning is in progress to drill additional exploratory production test wells.

CGC obtained extensive temperature gradient drilling data over the project area from an earlier exploration program which outlines the shallow thermal anomaly and obviates the need for further shallow gradient drilling work at Crump. Consequently, CGC submitted a revised deep slim well drilling program along with a progress report covering geophysical (gravity, seismic, aeromag) surveys completed, details of the earlier gradient well program, and environmental/permitting work to the Department of Energy (DOE) relative to the on-going \$3.4 million, cost-shared exploration program.

A deep well drilling program to test targets down to 5000 feet has commenced. Power market and transmission access feasibility studies are underway.

Pumpnickel, Nevada

The Pumpnickel Project has been extensively explored and is ready for development drilling. Three production test well sites are permitted and a level drill pad has been constructed at one location. A water license has been awarded for future power plant operations enabling a water cooled power plant and increasing power production during summer months. NGP is seeking a financial partner for further project development.

A \$3.2 million DOE cost-shared exploration program has been transferred from North Valley to the Pumpnickel Project. NGP will move ahead with environmental studies and a shallow soil-gas sampling program leading to two deep confirmation holes in collaboration with the DOE.

North Valley, Nevada

A \$300,000 deep confirmation well program is scheduled to commence shortly pending receipt of access road permits at North Valley in a central location within a 10-square-mile, high grade thermal anomaly. The well is intended to measure subsurface temperatures and to obtain geothermal brine samples and better define the potential geothermal resource temperature and field capacity.

About Nevada Geothermal Power Inc.:

Nevada Geothermal Power Inc. operates the 49.5 MW Faulkner 1 geothermal plant in Nevada. It is a growing, renewable energy developer focused on producing clean, efficient

and sustainable geothermal electric power from high temperature geothermal resources in the United States. NGP currently owns leasehold interests in five properties: Blue Mountain, Pumpnickel Valley, Edna Mountain and North Valley in Nevada, and Crump Geysler, in Oregon. These properties are at different levels of exploration and development. NGP estimates a potential of between 150 MW and 300 MW from its current leaseholds.

Nevada Geothermal Power Inc.
Brian D. Fairbank, P. Eng. President & CEO
<http://www.nevadageothermal.com>

Investor Inquiries:
Paul Mitchell
Nevada Geothermal Power Inc.
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This Press Release contains certain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. We have tried, whenever possible, to identify these forward-looking statements using words such as "anticipates," "believes," "estimates," "expects," "plans," "intends," "potential" and similar expressions. These statements reflect our current belief and are based upon currently available information. Accordingly, such forward-looking statements involve known and unknown risks, uncertainties and other factors which could cause the Company's actual results, performance or achievements to differ materially from those expressed in or implied by such statements. We undertake no obligation to update or advise in the event of any change, addition, or alteration to the information catered in this Press Release including such forward-looking statements.

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You can view the [Previous News](#) item: *Fri Feb 25, 2011. Reports Results for the Quarter ended December 31, 2010*

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EXHIBIT 44



Top News :

Analysis: Is government's role to fix economy?

Ormat Technologies and Nevada Geothermal Power Execute EPC Contract for Blue Mountain Faulkner 1 Power Plant

Wednesday, April 02, 2008 9:02 AM

VANCOUVER, British Columbia, April 2, 2008 /PRNewswire-FirstCall/ --Nevada Geothermal Power Inc. (NGP) (OTC Bulletin Board: NGLPF; TSX-V: NGP) and Ormat Technologies Inc. (NYSE: ORA) announced today that NGP Blue Mountain ILLC (NGP I) has entered into an Engineering, Procurement and Construction Contract (EPC) for a 49.5 MW power plant, consisting of three Ormat Energy Converters (OEC's) at Blue Mountain's geothermal project in Nevada. The plant design incorporates Ormat's proprietary power generation technology with water-cooling for maximum efficiency.

(Logo: <http://www.newscom.com/cgi-bin/prnh/20040422/LATH066LOGO>)

The total EPC contract value is US\$76 million, of which a US\$20 million was previously released under a Limited Notice to Proceed (LNTP) in order to secure the guaranteed substantial completion date of December 31, 2009. The full release under the EPC contract is subject to finalizing the financing for the project and is expected to occur by April 30, 2008. The EPC provides for an additional partial release if necessary.

The EPC consists of three Ormat Energy Converter units which are guaranteed to produce 16.5 MW (gross) each, totaling at least 49.5 MW (gross). The output of the power plant at Blue Mountain[®] will meet the Phase 1 power delivery requirements of the existing 20-year Power Purchase Agreement between NGP and Nevada Power Company with a reserve of excess power. NGP is currently in discussions with Nevada Power Company for a Phase II power contract covering the reserve power.

The EPC contract with Ormat increases the power output of each OEC unit to 16.5 MW from the originally planned 12.5 MW. The increased OEC capacity results in a lower cost per MW installed at Blue Mountain. Ormat's proven power plant technology combined with Blue Mountain's favourable reservoir chemistry will extract more megawatt-hours of energy per unit volume of geothermal fluid compared to other available technologies, maximizing the overall megawatt potential for the Blue Mountain geothermal field, stated **Brian Fairbank**, President and CEO of Nevada Geothermal Power Inc.

'We are pleased for the opportunity to work with NGP's development team and are delighted to contribute from our experience and knowledge in this field. Our technology is perfectly suited for the Blue Mountain resource and we are looking forward to delivering on schedule a great performing power plant,' said Dita Bronicki, CEO of Ormat Technologies Inc.

About Ormat Technologies

Ormat Technologies, Inc.

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No Comments

EXHIBIT 45

December 1, 2010

Top Plant: Blue Mountain Faulkner 1 Geothermal Power Plant, Humboldt County, Nevada

By Angela Neville, JD

Owner/operator: Nevada Geothermal Power Inc.

Completed in 2009 and partially funded under the American Reinvestment and Recovery Act, the 50-MW Blue Mountain Faulkner 1 Geothermal Power Plant is harnessing large amounts of renewable energy by tapping into an underground geothermal reservoir in northern Nevada. This subterranean source of heat allows the binary plant to generate pollution-free baseload electricity.

Hot rocks are hot business in the electric power sector these days. Currently, the U.S. has approximately 2,998.5 MW of geothermal energy capacity installed, which is 30.42% of the world's total. Proposed and planned U.S. geothermal plants now total approximately 7,800 MW—more than double the geothermal generating capacity that's already online. Currently identified geothermal resources in the U.S. could provide more than 20,000 MW of power to our nation, and it is estimated that undiscovered resources could provide five times that amount.

There are three general types of geothermal plants:

- *Dry steam.* Dry steam systems work by tapping into the naturally occurring pockets of steam or hot water that rise from deep underground, bringing with them the energy stored by rocks far below Earth's surface. The steam or hot water is then used to drive turbines and produce electricity. The best known dry steam projects are the Geysers plants in northern California.
- *Flash steam.* Flash steam plants flash high-pressure hot fluids to vapor at lower pressures and then use that vapor to make power.
- *Binary.* Binary plants recover energy from hot fluids to heat a secondary fluid that is used to produce electricity.

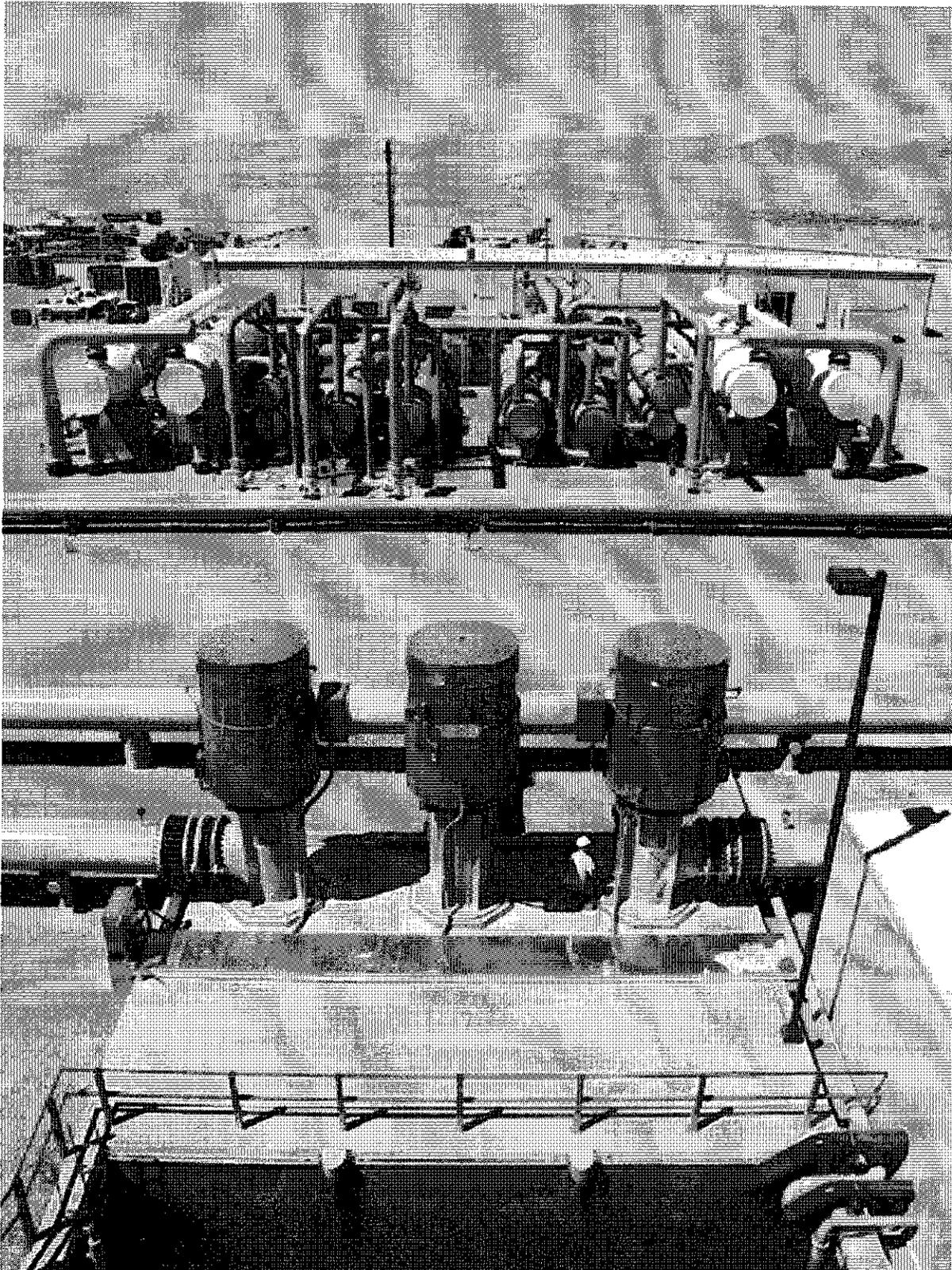
One of the great advantages of geothermal energy is that it can be produced with minimal environmental impacts. Another benefit is that geothermal energy can provide continuous baseload electric power generation, unlike other renewable resources, such as wind and solar energy, which are variable.

One example of the new wave in geothermal power generation is the recently completed 50-MW Blue Mountain Faulkner 1 Geothermal Power Plant. To help finance its project, in November 2009, Nevada Geothermal Power Inc. (NGP) applied for and received a \$57.9 million cash grant from the U.S. Department of the Treasury in lieu of tax credits for its geothermal power plant. This cash grant was funded by the American Reinvestment and Recovery Act. The total construction cost for the Blue Mountain power plant was \$180 million, and debt financing was handled by Trust Company of the West.

"Geothermal power plants cost less to construct than most other renewable energy power plants, which leads to much more robust project economics, particularly due to government incentives," explained Brian Fairbank, NGP president and CEO.

Plant Profile

NGP's Blue Mountain facility is a state-of-the-art binary cycle geothermal plant supplied to NGP by Ormat Technologies Inc. It uses a closed-loop heat exchange system in which hot geothermal fluid is used to heat a secondary fluid that has a lower boiling point. Isobutane, the secondary fluid used at the NGP plant, is vaporized and used to run a turbine and generate electricity (Figure 1).



1. Geothermal energy at work. The view from the cooling tower of the energy converters at NGP's Blue Mountain Faulkner Geothermal Power Plant in northern Nevada. *Courtesy: Nevada Geothermal Power Inc.*

ThermaSource and Ensign were the well drilling contractors at the plant. JFMPE was the piping contractor, and GeoThermEx Inc. handled the reservoir engineering.

Fifteen full-time NGP staff members operate, service, and maintain the power plant, which runs continuously, every day of the week.

NGP's Blue Mountain power plant started generating electricity in October 2009. Currently, the plant is operating at a net output of 37 MW and is selling power to NV Energy, which distributes power to much of Nevada and a corner of California, under a 20-year power purchase agreement.

At Blue Mountain, thermal water, which has an average temperature of >150C (300F), is supplied by five production wells and six injection wells. However, drilling is not complete and, at press time, a three-well program was scheduled to commence in late 2010.

Similar to many other newly commissioned power plants, the Blue Mountain power plant faced some challenges in its early days of operation. For example, in January, the facility experienced an electrical outage, which was repaired by the engineering, procurement, and construction contractor, Ormat. The plant was restarted in late February. A settlement has been reached, and NGP has been compensated for all losses incurred from the outage.

"We are pleased with the performance of the Faulkner 1 Power Plant at Blue Mountain and the transition of the company from developer to a significant power producer," Fairbank said. "Revenue from power sales increased steadily from start-up through each of the last quarters."

Another early challenge NGP faced was related to grid interconnectivity and accessing transmission lines, Fairbank explained. In the end, NGP built a 21-mile, 120-kV, wood pole transmission line, rated to carry up to 120 MW of power, from its Blue Mountain plant to the transmission grid connection at Mill City, Nevada.

Strong Geothermal Resources

The western U.S. has a remarkable variety of world-class geothermal resources, including the Geysers, a field in northern California, which is the world's largest electricity-producing geothermal system. The Blue Mountain geothermal resource in northern Nevada has in abundance the necessary elements to produce electricity. According to Fairbank, those are:

- A heat source, traditionally found in volcanically active areas, although the current industry focus is largely on deeply buried hot granites.
- Permeable rock—either fractured granites or sedimentary rocks such as sandstones.
- Water to transport the heat to the surface for power generation.

The Plant's Permitting Process

The permitting process involved a number of different entities. "As with most rural or remote areas in Nevada, the lands are checkerboarded federal and private ownership," Fairbank explained. "The Blue Mountain project is on both private and federal lands and thus entails a federal, U.S. Bureau of Land Management (BLM) permitting component. The BLM reviews projects under the National Environmental Policy Act and issues permits for utilization and commercial operation. Permitting this power facility entailed local (Humboldt County) permits and, as with most states, there is federal and state duplication of permitting the drilling of geothermal wells on federal lands."

On private lands, only the state agency issues drilling permits, Fairbanks said. In addition, Nevada's Division of Minerals and Division of Environmental Protection coordinates its permits so that one drilling permit approves the casing and cementing program, as well as injection and surface discharge facilities. Changes to these permits are addressed through sundry notices.

Completion of a project such as the Blue Mountain plant requires that well over a hundred leases, easements, water rights, exploration and development drilling permits, environmental and land surveys, and plan approvals be obtained. The transmission and sale of power also requires oversight by the Nevada Public Utilities Commission, the

Federal Energy Regulatory Commission, and the PUC Utility Environmental Protection Act.

Community Reaction to the Geothermal Plant

Residents of the city of Winnemucca in Humboldt County, Nev., appear to be pleased with having the Blue Mountain Faulkner 1 Geothermal Power Plant as their new neighbor.

"These are the types of operations that should receive funding, as they provide for eventual cost saving through renewable energy that benefits everyone," Di An Putnam, Winnemucca's mayor, said in a press release in February. "There is also an immediate economic benefit to the area."

The plant will help Nevada meet its renewable energy portfolio standard requirements while creating new green jobs to help with its operation. Additionally, it helps to supply the area with clean, domestic renewable energy while reducing reliance on fossil fuels and associated carbon emissions.

"Nevada Geothermal Power has been a great addition to [Winnemucca's] industrial makeup," Putnam said. "They have provided diversity to our job base, which is a key element in our community's growth. Even more so, they have put our area on the green energy map."

Looking Ahead

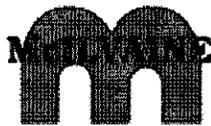
Fairbank said that NGP estimates that the long-term production potential for the Blue Mountain plant's wells at this site is "20 years plus."

"By expanding the Blue Mountain Faulkner 1 Geothermal Power Plant, NGP plans to increase out to 71 MW net (89 MW gross) by the end of 2011," he said. "In addition, NGP anticipates that they will place both the Crump Geyser and the Pumpernickel geothermal power plants online by the end of 2013."

— **Angela Neville, JD**, is senior editor of *POWER* magazine.

Close Window

EXHIBIT 46



Renewable Energy Update and Projects

Brochure Home

Projects

- **Biomass**
- **Geothermal**
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- **Marine**
- **Solar**
- **Wind**

Update Sample

Order Form

Geothermal Projects

Project Title: Carson Lake Geothermal Plant

location: Fallon, NV

startup date: 2010

size: 30 MW

project type: Geothermal, Binary

descriptions: March 2008: Nevada Power Co., a wholly owned subsidiary of Sierra Pacific Resources, announced that it has entered into a joint ownership agreement with Ormat Nevada, Inc., a wholly owned subsidiary of Ormat Technologies, Inc. for the co-development of the Lake Carson geothermal energy project.

Contractors:

Ormat Nevada Developer/Owner

Nevada Public Utilities Commission Power Purchaser

NV Energy, Inc. Co-Developer

Nevada Power Co. Co-Developer/Owner

Project Title: Blue Mountain Faulkner I LLC Geothermal Plant

location: Winnemucca, NV

startup date: 2009

size: 49.5 MW

project type: Geothermal

descriptions: June 2010: The Company intends to increase production from this plant to 45 MW (net) through an optimization program during the remainder of 2010. Funds necessary for this program will be made available from a drilling reserve fund established as part of the US\$98.5 million John Hancock financing. May 2010: The plant has been operating continuously since its restart on March 5th. For the period of April 1st to 30th, with cable repairs completed, output averaged approximately 37 MW (net) and plant availability was greater than 98%. Gross revenue generated for the month was approximately US\$2.0 million. The plant has achieved record electric power production in early May '10, with peak outputs exceeding 53MW (gross) and with 41MW (net), enough power to supply 40,000 homes, being delivered to the grid. The increased production was enabled by operational adjustments at the plant. Construction work (pump installation, pipeline construction, and power line) is underway to connect production well 44-14 which is expected to raise potential plant output by a further 5-7 MW. March 11, 2010: Plant has been producing at 34.5 MW. March 4, 2010: Interim power production was increased from 13 MW to 26 MW with permanent cables installed to Turbine Generator Units One and Three. Cable repairs are expected to be fully completed to Unit Two and other electrical equipment on or before March 2010 allowing the plant to be fully operational. Newly drilled and tested, deep injection wells, 55-15 and 58-11, will allow production levels to be increased shortly after the plant is returned to full service. New production well 91-15 is undergoing flow tests. Additional development drilling is continuing to test a target area southwest of the current production field. November 2009: Nevada Geothermal Power Inc. received a US\$57.9 million Federal Grant to be used to pay down TCW debt, to perform new drilling at Blue Mountain, and for general corporate purposes. October 16, 2009: A dedication ceremony will be held on the 22nd of the month. October 13, 2009: The company has mandated John Hancock Life Insurance Co. to be the exclusive debt provider for an up to US\$95 million term loan facility for this project. The loan proceeds can be used for funding a debt service reserve account, for drilling and for partial repayment of the

14% TWC note. September 2009: Nevada Geothermal Power Inc. announced that this project has successfully completed testing requirements three months ahead of schedule. Power plant equipment has exceeded guaranteed output levels. August 2009: The company announced that construction is completed. Mechanical, electrical and metering systems are installed for three Energy Convertors and the cooling tower, control building, fire protection, safety systems and site grading are ready for operation. NGP has completed a 210 mile power line interconnection to the Sierra Pacific Power Company power grid, the production and injection well field, local power distribution system, and microwave communication system. June 2009: NGP has completed six production wells capable of producing approximately 42 MW net of power. NGP has recently completed injection Well 61-22 bringing the total injection wells to four (58-15, 58A-15, 57-15 and 61-22). Wells 58-15 and 57-15 have been tested as high volume deep injectors [2000 -- 3000 gallons per minute (gpm)]. Well 58A-15 is a high volume shallow injector (>3000 gpm) and Well 58B-15, currently being drilled, is expected to have similar injection capacity. The total injection capacity is sufficient to re-inject all the production fluids from the production wells. June 2009 Construction Update: Ormat is greater than 90% complete and has started system checks; well pumps are being installed; additional water licenses have been obtained for the cooling water allowing NGP to draw extra ground water to support the cooling system for the expanded geothermal power plant. Water well drilling and water pipeline construction is anticipated to be completed the first week of July; water cooling tower construction is complete; Ormat's transformer testing has been completed and has been shipped to the Blue Mountain site; Wilson Utility has completed the construction of the transmission line; NV Energy will complete the switchyard station by the end of June at the grid interconnection point north of Mill City and have planned system modifications as per the Large Generator Interconnection Agreement to allow connection to the grid; all personnel have been hired for the operation of the 'Faulkner 1' power plant and training has been underway for several months; well field pipeline/gathering system is under construction and is expected to be completed July 2009; microwave communication and local power distribution systems construction are underway. The proposed plant will require a 20-mile long transmission line over relatively flat, undeveloped desert and to a connection point on the utility's (Sierra Pacific) 120kV-transmission line north of Mill City, Nevada. The first unit will provide 35 MW and the second unit will provide 24 MW. On May 1, 2008, Nevada Geothermal Power, Inc. announced that NGP Blue Mountain 1 LLC (NGP 1) has issued a Second Limited Notice to Proceed (LNTP) under the fixed-prices, date-certain engineering, procurement and construction (PC) contract signed with Ormat Nevada Inc. to supply and construct the Phase 1 power plant of NGP's planned geothermal power development at Blue Mountain, Nevada. In July 2008, Nevada Geothermal Power, Inc. reported that the loan for this facility has been increased to US\$145 million. On September 4, 2008, Nevada Geothermal Power Inc. and Ormat Technologies Inc. announced that NGP Blue Mountain 1 LLC has issued a Full Notice to Proceed (FNTP) under its fixed-price, date-certain EPC contract with Ormat Nevada Inc. to supply and construct the Phase 1 49.5 MW gross "Faulkner 1" geothermal power plant at Blue Mountain, Nevada. On February 2, 2009, an update on the construction was announced: first major power plant components were delivered; results of drilling program were identified; part of the transmission line completed. Project is proceeding on schedule and within budget. On March 25, 2009, a successful production well drilling was completed. June 1, 2009: Nevada Geothermal Power Inc. announced that this facility is ahead of schedule and Ormat expects to be ready to start power plant commissioning during August 2009.

Contractors:

Nevada Geothermal Power, Inc. Developer/Owner/Operator
 Sierra Pacific Power Co. Power Purchaser
 ThermaSource Inc. Drilling
 Ormat EPC Contractor
 Morgan Stanley Commodities Loan Provider
 Glitnir Capital Corporation Loan Provider
 Wilson Utility Construction Co. Transmission Line Engineering/Construction
 John Hancock Funds Financier
 Nevada Energy Power Purchaser

Project Title: Patuha Geothermal Project

location: Patuha, Bandung, West Java, Indonesia

startup date:

size: 55 MW

project type: Geothermal

descriptions: PT Geo Dipa Energi (GDE) signed a deal in March 2009 with a state engineering company and state-run bank to construct and finance this geothermal power plant. The area has a potential of 400 MW.

Contractors:

PT Rekayasa Industri (REKIND) Engineering

Bank Negara Indonesia Financing

PT Geo Dipa Energi Developer/Owner/Operator



191 Waukegan Road Suite 208 Northfield, Illinois 60093 USA
Phone: 847 784 0012 Fax: 847 784 0061

EXHIBIT 47

COUNTY OF IMPERIAL
EAST BRAWLEY GEOTHERMAL
VOLUME I - DRAFT ENVIRONMENTAL IMPACT REPORT

Prepared for:

COUNTY OF IMPERIAL
DEPARTMENT OF PLANNING AND
DEVELOPMENT SERVICES
801 MAIN STREET
EL CENTRO, CA 92243

Prepared by:



1122 STATE STREET, SUITE A
EL CENTRO, CA 92243

MARCH 2011

COUNTY OF IMPERIAL
EAST BRAWLEY GEOTHERMAL
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EL CENTRO, CA 92243

Prepared by:

PMC
1122 STATE STREET, SUITE A
EL CENTRO, CA 92243

MARCH 2011

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1.0 INTRODUCTION

This section summarizes the purpose of the Environmental Impact Report (EIR), describes the environmental procedures that are to be followed according to state law, discusses the intended uses of the EIR, discusses the project's relationship to the Imperial County General Plan, describes the EIR scope and organization, identifies a contact person for the project, and provides definitions of impact terminology, commonly used terms, and acronyms used throughout this EIR.

1.1 BACKGROUND AND PURPOSE

This EIR has been prepared, in conformance with the provisions of the California Environmental Quality Act (CEQA), to evaluate the potential environmental effects of the proposed East Brawley Geothermal Development project (project). The proposed project consists of a geothermal plant on one parcel that is 33.7 acres. Additionally, 39 leased parcels encompassing approximately 3,015.0 acres contain proposed wells and pipelines and are also included as part of the project. The total area of disturbance for the project site is approximately 188.75 acres, which includes both the plant site and the wells and pipelines. The proposed project will also upgrade and connect to the Brawley Wastewater Treatment Plant to receive tertiary treated water for cooling purposes.

Imperial County (County), acting as the lead agency, has prepared this Draft EIR (DEIR) to provide the public, responsible agencies, and trustee agencies with information about the potential environmental effects of the proposed East Brawley Geothermal Development project. As described in the State CEQA Guidelines Section 15121(a), an EIR is a public informational document that assesses potential environmental effects of the proposed project and identifies mitigation measures and alternatives to the proposed project that could reduce or avoid its adverse environmental impacts. Public agencies are charged with the duty to consider and minimize environmental impacts of proposed development, where feasible, and obligated to balance a variety of public objectives including economic, environmental, and social factors.

CEQA requires the preparation of an EIR prior to approving any project which may have a significant effect on the environment. For the purposes of CEQA, the term "project" refers to the whole of an action which has the potential for resulting in a direct physical change or a reasonably foreseeable indirect physical change in the environment (State CEQA Guidelines Section 15378[a]). With respect to the East Brawley Geothermal Development project, the County has determined that the proposed development constitutes a project within the definition of CEQA, and that the preparation of an EIR was appropriate due to the significant environmental impacts that could be caused by implementing the proposed project.

1.2 TYPE OF DOCUMENT

The State CEQA Guidelines identify several types of EIRs, each applicable to different project circumstances. This EIR has been prepared as a Project EIR pursuant to State CEQA Guidelines Section 15161. The analysis associated with a Project EIR focuses primarily on the changes in the environment that would occur as a result of project implementation and examines all phases of the project (i.e., planning, construction, and operation). The project-level analysis addresses impacts resulting from the development and operation of the geothermal power plant and from the provision of infrastructure and services for the project.

Ultimately, the EIR will be used by the County as a tool in evaluating the proposed project's environmental impacts and can be further used to modify, approve, or deny approval of the proposed project based on the analysis provided in the EIR.

1.0 INTRODUCTION

1.3 INTENDED USES OF THE EIR

This EIR is intended to evaluate the environmental impacts of the project to the greatest extent possible. This EIR, in accordance with State CEQA Guidelines Section 15126, should be used as the primary environmental document to evaluate all subsequent planning and permitting actions associated with the project. Subsequent actions include, but are not limited to, the following:

IMPERIAL COUNTY

Actions required to be taken by the Board of Supervisors, Planning Commission, and/or County staff may include, but are not limited to, the following approvals:

- Conditional Use Permit(s) (CUP 08-0023) for power plant operations and for on-site wells
- Approval of a project Mitigation Monitoring and Reporting Program (MMRP)
- Approval of CEQA findings pursuant to State CEQA Guidelines Section 15091

Subsequent approvals may include, but are not limited to:

- Encroachment Permit
- Grading Permit
- Improvement Plans
- Septic Permit
- Building Permit(s)

IMPERIAL COUNTY AIR POLLUTION CONTROL DISTRICT

- Authority to Construct
- Permit to Operate

REGIONAL WATER QUALITY CONTROL BOARD – REGION 7

- National Pollution Discharge Elimination System (NPDES) Construction Activity General Permit (CA-S000002) – Requires the applicant to file a public Notice of Intent to discharge stormwater and to prepare and implement a stormwater pollution prevention plan (SWPPP)
- NPDES General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (CA-S000004) – Requires that discharges of pollutants from areas of new development be reduced to the maximum extent practicable in order to protect receiving waters and uphold water quality standards
- Approval of a stormwater pollution prevention plan per permit requirements listed above

- Waste Discharge Requirements – Required for discharge of drilling mud and cuttings during drilling operations and for septic systems, as required by the Colorado River Basin California Regional Water Quality Control Board

CALIFORNIA DEPARTMENT OF FISH AND GAME (CDFG)

- Incidental take permits (for loss of California special-status species or their habitat may apply, if necessary)

IMPERIAL COUNTY CERTIFIED UNIFIED PROGRAM AGENCY

- Permitting for hazardous waste storage

IMPERIAL COUNTY DEPARTMENT OF PUBLIC HEALTH

- Septic tank permit

In addition to the subsequent actions that will occur with project approval, the project proponent will be upgrading the City of Brawley Wastewater Treatment Plant capacity from secondary to tertiary treatment. Therefore, the City of Brawley has been designated as a responsible agency.

LOCAL AGENCY FORMATION COMMISSION (LAFCo)

In accordance with Government Code 56133, a city or district may provide new or extended services by contract or agreement outside its jurisdictional boundaries only if it first requests and receives written approval from the commission in the affected county. Therefore, the proposed project will need to seek LAFCo review and approval.

1.4 RELATIONSHIP TO THE IMPERIAL COUNTY GENERAL PLAN

The Imperial County General Plan was adopted on November 9, 1993. Various elements have been updated since that time, with the latest updates occurring in January 2008. The General Plan is the County's overall guide for the use of Imperial County's resources, expresses the development goals of the community, and is the foundation upon which all land use decisions are made.

The proposed project site is located in unincorporated Imperial County, subject to the Imperial County General Plan and Land Use Ordinance, and within the Geothermal Overlay Zone. As discussed in Section 4.9, Land Use and Planning, the proposed project is consistent with the existing land use designation of the Geothermal Overlay Zone and with the existing Imperial County Land Use Ordinance.

This EIR provides an analysis of environmental effects specifically associated with the proposed project. Consistent with State CEQA Guidelines Section 15183, this EIR addresses environmental effects that are peculiar to the project and utilizes mitigation measures that are based on adopted County development policies and standards to mitigate anticipated impacts. The proposed project's consistency with applicable General Plan policies is discussed under each of the subject categories in Sections 4.1 through 4.14. Potential effects of implementing the proposed project are identified, including cumulative effects that may occur as a result of the proposed project in conjunction with other projects in the vicinity (see Section 4.0). Where

1.0 INTRODUCTION

potentially significant effects are identified, mitigation measures are recommended to lessen or reduce identified impacts to less than significant.

1.5 ORGANIZATION AND SCOPE

Sections 15122 through 15132 of the State CEQA Guidelines identify the content requirements for Draft and Final EIRs (FEIRs). An EIR must include a description of the environmental setting, an environmental impact analysis, mitigation measures, alternatives, significant irreversible environmental changes, growth-inducing impacts, and cumulative impacts. The environmental issues addressed in the DEIR were established through review of environmental documentation developed for the site, environmental documentation for nearby projects, and public agency responses to the Notice of Preparation (NOP) (**Appendix A**). Based upon these comments, agency consultation, and review of the project application, the County determined the scope for this EIR.

This DEIR is organized in the following manner:

SECTION 1.0 – INTRODUCTION

Section 1.0 provides an introduction and overview describing the intended use of this EIR and the review and certification process.

SECTION 2.0 – EXECUTIVE SUMMARY

This section summarizes the characteristics of the proposed project and provides a concise summary matrix of the project's environmental impacts and associated mitigation measures.

SECTION 3.0 – PROJECT DESCRIPTION

This section provides a detailed description of the proposed project, including intended objectives, background information, and physical and technical characteristics.

SECTION 4.0 – ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

Section 4.0 contains an analysis of environmental topic areas as identified below. Each subsection within Section 4.0 (4.1 through 4.14) contains a description of the existing setting of the project area, identifies standards of significance, identifies project-related impacts, and recommends mitigation measures.

The following major environmental topics are addressed in this section:

Aesthetics: This section describes the existing landscape characteristics, considers consistency of the project with applicable General Plan policies, and analyzes the project with regard to the County's Zoning Ordinance relative to viewsheds.

Agricultural Resources: This subsection describes the agricultural resources of the project site and the potential impacts of the conversion of farmland, conflicts with Williamson Act contracts, and other changes that could result in conversion of adjacent farmland. The impact evaluation will identify land use compatibility conflicts associated with new development adjacent to farmland.

Air Quality: This section discusses local and regional air quality impacts associated with project implementation. Both short-term construction-related impacts and long-term operational air quality impacts are examined.

Biological and Natural Resources: This section examines the project's potential impacts on habitat, vegetation, and wildlife. The analysis emphasizes the potential degradation or elimination of important habitat and the impacts on listed, proposed, and candidate threatened and endangered species.

Cultural Resources: This section addresses potential impacts on both archaeological and paleontological components occurring on and in the vicinity of the project site.

Geology and Soils: This section describes the existing geologic and soil conditions of the project site. Potential geologic or soil stability issues associated with the project are examined.

Hazardous Materials/Public Health: This section assesses the likelihood for the presence of hazardous materials and hazardous conditions on the project site and in the project area and evaluates their potential impact on human health.

Hydrology and Water Quality: This section describes the existing hydrologic conditions of the project area and provides information on existing surface water and groundwater conditions. In addition, construction and operational water quality impacts of the project on local hydrological conditions, including drainage areas, groundwater quality and supply, and changes in drainage flow rates, are examined.

Land Use and Planning: This section describes the existing land use characteristics of the project area and identifies land use designations, zoning, and relevant General Plan land use policies. This section also addresses land use impacts associated with implementation of the proposed project including project compatibility with surrounding land uses, consistency with County land use goals and policies, potential land use conflicts, land use patterns, and impacts to adjacent uses.

Noise: This section describes the existing noise setting on the project site as well as noise impacts anticipated to result from construction and operation of the proposed project. Specific noise sources evaluated for this analysis include construction activity, mechanical equipment, on-site circulation, and off-site traffic and on-site noise source impacts to sensitive receptors.

Public Services: This section describes existing public services available to serve the project and identifies any expansions of capacity or services that will be necessary to meet demands generated by the proposed project. This section includes a discussion of fire, police, schools, and other public services.

Transportation and Circulation: This section addresses impacts on the local and regional road system and proposed internal circulation patterns. In addition, this section assesses impacts on transit, bicycle, and pedestrian facilities.

Utilities: This section describes existing utilities and service systems available to serve the project and identifies any extensions/expansions of capacity that will be necessary to meet demands generated by the proposed project. This section includes a discussion of water, wastewater, solid waste collection systems, and landfills. This section also discusses existing and proposed electricity, natural gas, telephone, and cable television services related to the proposed project.

1.0 INTRODUCTION

Climate Change and Greenhouse Gas Emissions: This section describes the existing setting and regulatory conditions of the County of Imperial and surrounding area in terms of greenhouse gases and climate change, and identifies potential related impacts that may occur as a result of implementation of the proposed project.

SECTION 5.0 – CUMULATIVE IMPACTS SUMMARY

This section discusses the cumulative impacts associated with the proposed project. As required by CEQA Section 15130, an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable.

SECTION 6.0 – ALTERNATIVES TO THE PROJECT

CEQA Guidelines Section 15126.6 requires that an EIR describe a range of reasonable alternatives to the project that could feasibly attain the basic objectives of the project and avoid and/or lessen the environmental effects of the project. This alternatives analysis provides a comparative analysis between the project and the selected alternatives, which include:

- Under Alternative 1, the No Project, No Build Alternative scenario, the proposed project site is assumed to remain in its current condition as undeveloped agricultural land.
- Under Alternative 2, the project uses reclaimed water from the City of Brawley, geothermal brine, and cooling tower blowdown to make up the balance of water needed to service the project.
- Under Alternative 3, the project uses reclaimed water and groundwater to make up the balance of water needed to service the project.
- Under Alternative 4, the project would use Imperial Irrigation District (IID) water for the project needs.

SECTION 7.0 – LONG-TERM IMPLICATIONS OF THE PROJECT

This section contains discussions and analysis of various topical issues mandated by CEQA. These include significant environmental effects that cannot be avoided if the project is implemented, irreversible environmental changes, and growth-inducing impacts.

SECTION 8.0 – REPORT PREPARERS

This section lists all authors and agencies that assisted in the preparation of the report by name, title, and company or agency affiliation.

APPENDICES

This section includes all notices and other procedural documents pertinent to the EIR, as well as all technical material prepared to support the analysis. All appendices are located in Volume II, Technical Appendices, of this EIR.

Effects Not Found to Be Potentially Significant

Typically, an EIR evaluates project or program effects on environmental issues listed in the Environmental Checklist Form, which is in Appendix G of the CEQA Guidelines. The NOP for the DEIR identified potential environmental issues that were generally consistent with those found in the Environmental Checklist. Based on preliminary evaluation associated with preparation of the NOP, the County determined that the proposed project would not have a potential to affect mineral resources, population and housing, socioeconomics, or recreational resources. No other issues were scoped out from analysis in the EIR.

1.6 ENVIRONMENTAL REVIEW PROCESS

The review and certification process for the EIR involves the following procedural steps:

NOTICE OF PREPARATION AND INITIAL STUDY

In accordance with Section 15082 of the CEQA Guidelines, the County prepared a Notice of Preparation (NOP) of an EIR and an Initial Study for the project on June 17, 2010 (SCH# 2010061054). The NOP and Initial Study are included in **Appendix A**. The County was identified as the lead agency for the proposed project. This notice was circulated to the public, local, state, and federal agencies and other interested parties to solicit comments on the proposed project. The 35-day comment period closed on July 22, 2010. A scoping meeting was held on June 24, 2010, at Imperial County to solicit input from interested agencies and the public. No concerns were received at the scoping meeting.

The County received comment letters on the NOP for the East Brawley Geothermal Development project DEIR from the following federal, state, and local agencies and interested parties:

**TABLE 1.0-1
COMMENTS LETTERS RECEIVED ON THE NOTICE OF PREPARATION**

Individual	Agency	Date
Jacob Armstrong	Department of Transportation, District 11	June 30, 2010
Clifford E. Parli	Department of Conservation	July 19, 2010
Gerald R. Zimmerman	California Water Quality Control Board, Colorado River Basin Region	July 27, 2010

The major concerns identified for the project was the project proponent obtaining water service for the power plant cooling, water and water quality impacts associated with uses of groundwater for proposed project, and biological impacts associated with the Salton Sea. In addition, another concern related to ensuring the applicant obtains the requisite permits.

DEIR

This document constitutes the DEIR. The DEIR contains a description of the project, description of the environmental setting, identification of project impacts, and mitigation measures for impacts found to be significant, as well as an analysis of project alternatives. Upon completion of the DEIR, the County will file the Notice of Completion (NOC) with the State Office of Planning and Research, State Clearinghouse to begin the public review period.

1.0 INTRODUCTION

PUBLIC NOTICE/PUBLIC REVIEW

Concurrent with the NOC, the County will provide public notice of the availability of the DEIR for public review and invite comment from the general public, agencies, organizations, and other interested parties. As an industrial project that will occupy more than 40 acres of land, the project is a Project of Statewide, Regional or Area-wide Significance, requiring a minimum comment period of 45 days and submittal of the DEIR for state agency review to the State Clearinghouse (CEQA Section 21083(d); CEQA Guidelines Section 15206). Public comment on the DEIR will be accepted both in written form and orally at public hearings. All comments or questions regarding the DEIR should be addressed to:

Angelina Havens, Planner III
IMPERIAL COUNTY PLANNING AND DEVELOPMENT SERVICES DEPARTMENT
801 Main Street
El Centro, CA 92243

RESPONSE TO COMMENTS/FEIR

Following the DEIR public review period, an FEIR will be prepared. The FEIR will respond to written comments received during the public review period.

CERTIFICATION OF THE EIR/PROJECT CONSIDERATION

The County will review and consider the FEIR. If the County finds that the FEIR is "adequate and complete," the County may certify the FEIR at a public hearing. The rule of adequacy generally holds that the FEIR can be certified if it shows a good faith effort at full disclosure of environmental information and provides sufficient analysis to allow decisions to be made regarding the project in contemplation of its environmental consequences.

Upon review and consideration of the FEIR, the County may take action to approve, revise, or reject the project. A decision to approve the project would be accompanied by written findings in accordance with State CEQA Guidelines Section 15091 and, if applicable, Section 15093. A Mitigation Monitoring and Reporting Program (MMRP), as described below, would also be adopted for mitigation measures that have been incorporated into or imposed upon the project to reduce or avoid significant effects on the environment. The MMRP would be designed to ensure that these measures are carried out during project implementation.

MITIGATION MONITORING

CEQA Section 21081.6(a) requires lead agencies to adopt an MMRP to describe measures which have been adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment. The specific "reporting or monitoring" program required by CEQA is not required to be included in the EIR; however, it will be presented to the Board of Supervisors for adoption. Throughout the EIR, however, mitigation measures have been clearly identified and presented in language that will facilitate establishment of an MMRP. Any mitigation measures adopted by the County as conditions for approval of the project will be included in an MMRP to verify compliance.

1.7 IMPACT TERMINOLOGY

Identified below are common terms used throughout this document. A complete list of acronyms is also provided.

CEQA TERMINOLOGY

This DEIR uses the following terminology to describe environmental effects of the proposed project:

Cumulatively Considerable: A cumulative significant impact would result when the project would contribute considerably to a significant physical impact on the environment expected under cumulative conditions.

Less Than Cumulatively Considerable: A less than cumulatively considerable impact would result when the project would not contribute considerably to a significant physical impact on the environment expected under cumulative conditions.

Less Than Significant Impact: A less than significant impact would cause no substantial change in the environment (no mitigation required).

No Impact: No adverse change to the environment would occur.

Potentially Significant: A potentially significant impact is one that may or may not occur and where a definite determination cannot be made. Feasible mitigation measures and/or project alternatives are identified to avoid or reduce the project's effects on the environment to a less than significant level.

Significant Impact: A significant impact would cause (or would potentially cause) a substantial adverse change in the physical conditions of the environment. Significant impacts are identified by the evaluation of project effects using specified standards of significance. Mitigation measures and/or project alternatives are identified to reduce project effects on the environment.

Significant Unavoidable Impact: A significant and unavoidable impact would result in a substantial change in the environment that cannot be avoided or mitigated to a less than significant level if the project is implemented.

Standards of Significance: A set of criteria used by the lead agency to determine at what level or "threshold" an impact would be considered significant. Significance criteria used in this EIR include the State CEQA Guidelines; factual or scientific information; regulatory performance standards of local, state, and federal agencies; and County goals, objectives, and policies.

1.8 COMMONLY USED TERMS

Identified below are common terms used throughout this document. A complete list of abbreviations is also provided.

1.0 INTRODUCTION

TERMS

Applicant – Any person or other legal entity who applies to the County to develop or improve any portion of the real property within the project boundaries. The term shall include all successors in interest.

County – Imperial County.

Developer – Any person or other legal entity who performs actual construction activities that convert the project site to urban uses. Such activities include, but are not limited to, grading, building construction, and installation of infrastructure.

Draft EIR (DEIR) – Draft Environmental Impact Report.

Final EIR (FEIR) – Final Environmental Impact Report.

General Plan – The General Plan of the County of Imperial, adopted November 1993; various updates to elements have been made, with the latest updates occurring in January 2008.

Land Use Ordinance – The Land Use Ordinance of the County of Imperial, as adopted November 24, 1998, and as revised in 2006.

Project (or Proposed Project) – The development or improvement of the project site, as defined by the project application.

Project site – The real property described by the project application and in Section 3.0, Project Description, of this document.

ABBREVIATIONS

AB	Assembly Bill
ADT	average daily traffic
AFY	acre-feet per year
ALUC	Airport Land Use Commission
ALUCP	Airport Land Use Compatibility Plan
AST	aboveground storage tank
ASTM	American Standard of Testing and Materials
ATCM	Airborne Toxics Control Measure
BACT	best available control technology
BMP	best management practices
BP	Before Present
BWWTP	Brawley Wastewater Treatment Plant
CAA	Clean Air Act
CAAA	Clean Air Act Amendments

CalARP	California Accidental Release Prevention
CalEPA	California Environmental Protection Agency
Cal/OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CAT	Climate Action Team
CBSC	California Building Standards Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDOGGR	California Division of Oil, Gas and Geothermal Resources
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFC	California Fire Code
CFR	Code of Federal Regulations
CH ₄	methane
CHP	California Highway Patrol
CIWMP	Countywide Integrated Waste Management Plan
CNDDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalents
CPUC	California Public Utilities Commission
CRBRWQCB	Colorado River Basin Regional Water Quality Control Board
C ₆ H ₆	benzene
CUP	Conditional Use Permit
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
CWC	California Water Code
dB	decibel

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dba	A-weighted decibel
DEIR	Draft Environmental Impact Report
DHS	Department of Health Services
DOC	Department of Conservation
DOF	California Department of Finance
DOT	United States Department of Transportation
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
EDP	Equitable Distribution Plan
EIR	environmental impact report
EMS	Emergency Medical Services
EOP	Emergency Operations Plan
EPA	United States Environmental Protection Agency
ERP	Emergency Response Plan
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FICON	Federal Interagency Committee on Noise
FMMP	Farmland Mapping and Monitoring Program
FTA	Federal Transit Administration
GHG	greenhouse gas
gpm	gallons per minute
GWP	global warming potential
HAP	hazardous air pollutants
HCM	Highway Capacity Manual
HFC	hydrofluorocarbons
HMMP	Hazardous Materials Management Plan
H ₂ S	hydrogen sulfide
ICAPCD	Imperial County Air Pollution Control District
ICFD	Imperial County Fire Department
IID	Imperial Irrigation District

IRF	Intermediate Regional Flood
ISO	Insurance Services Office
IWRMP	Integrated Water Resources Management Plan
KGRA	Known Geothermal Resource Area
kV	kilovolt
kw	kilowatt
LAFCo	Local Agency Formation Commission
L _{dn}	day-night noise level
L _{eq}	energy equivalent noise level
LESA	Land Evaluation and Site Assessment
LIM	Land Inventory and Monitoring
L _{max}	maximum noise level
L _{min}	minimum noise level
LOS	level of service
LUST	leaking underground storage tank
MBTA	Migratory Bird Treaty Act
mgd	million gallons per day
mg/L	milligrams per liter
MMRP	Mitigation Monitoring and Reporting Program
MND	Mitigated Negative Declaration
msl	mean sea level
MW	megawatt
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NCG	noncondensable gas
NEL	numeric effluent limitation
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NIH	National Institute of Health
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NOC	Notice of Completion
NOP	Notice of Preparation

1.0 INTRODUCTION

NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NPDES	National Pollution Discharge Elimination System
NRCS	National Resources Conservation Service
N ₂ O	nitrous oxide
OEC	Ormat Energy Converter
OES	Office of Emergency Services
OHP	Office of Historic Preservation
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
O ₃	ozone
Pb	lead
PCB	polychlorinated biphenyl
PFC	perfluorocarbons
PM	particulate matter
PM ₁₀	particulate matter ≤10 microns
PM _{2.5}	particulate matter ≤2.5 microns
PPC	Public Protection Classification
ppm	parts per million
PPV	peak particle velocity
PRC	Public Resources Code
PVC	polyvinyl chloride
QSA	Quantification Settlement Agreement
RCRA	Resource Conservation and Recovery Act of 1976
RMP	Risk Management Program
ROC	reactive organic compound
ROG	reactive organic gas
RTO	regenerative thermal oxidizer
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCAG	Southern California Association of Governments
SCS	Soil Conservation Service

SDI	Supply Demand Imbalance
SEL	single event noise level
SEMS	Standardized Emergency Management System
SF ₆	sulfur hexafluoride
SIP	State Implementation Plan
SO ₂	sulfur dioxide
SR	State Route
SRRE	Source Recycling and Recycling Element
SSAB	Salton Sea Air Basin
SVP	Society of Vertebrate Paleontology
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminants
TDS	total dissolved solids
TMDL	Total Maximum Daily Load
UBC	Uniform Building Code
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
V/C	volume to capacity
VdB	vibration decibels
WDR	waste discharge requirement
WQMP	Water Quality Management Plan

2.0 EXECUTIVE SUMMARY

This section provides an overview of the proposed East Brawley Geothermal Development project and the environmental analysis. For additional detail regarding specific issues, please consult the appropriate chapter of Sections 4.1 through 4.14 (Environmental Setting, Impacts, and Mitigation Measures) of this Draft Environmental Impact Report (Draft EIR or DEIR).

2.1 PURPOSE AND SCOPE OF THE EIR

This Draft EIR provides an analysis of the potential environmental effects associated with the approval of the East Brawley Geothermal Development project located in Imperial County. The project proposes a geothermal development project consisting of the plant being developed on one 33.7-acre parcel and 39 leased parcels encompassing approximately 3,033.2 acres that will contain proposed wells and pipelines. The total area of disturbance for the project site is approximately 188.75 acres, which includes both the plant site and the wells and pipelines.

The DEIR analysis focuses on potential impacts arising from development of the proposed project. The DEIR adopts this approach in order to provide a credible worst-case scenario of the impacts resulting from project implementation. Where appropriate, some impacts are analyzed under future conditions, which assume buildout of reasonably foreseeable projects in the area. Other issues that are site-specific in nature are evaluated against baseline conditions.

2.2 PROJECT CHARACTERISTICS

The East Brawley Geothermal Development project includes the following project components:

- A 49.9 net megawatt (MW) geothermal power plant consisting of up to six Ormat Energy Converter (OEC) binary generating units (16 MW gross each) with vaporizers, turbines, generators, condensers, preheaters, pumps and piping, motive fluid (isopentane) storage, a motive fluid vapor recovery system, a gas scrubber, and possibly a regenerative thermal oxidizer (RTO) and related ancillary equipment.
- Two cooling tower batteries with a total of 14–20 cell counter flow, induced draft with drift eliminators of 0.0005 efficiency.
- A control room, office maintenance shop, parking, and other facilities located at the power plant site.
- Approximately 36 total wells, approximately half for production and half for injection. The final number of wells will be determined by drilling results. Each well will average 4,500 feet in depth. Production wells will have a gas separator and corrosion and scale inhibitor and geothermal fluid booster pump to pump the fluid to the power plant. The production and injection wells may also have a sand separator. Six of these wells were already approved by the County under the East Brawley exploration permit (CUP 07-0029). Five wells were already drilled on three well pads.
- Piping from production wells to the power plant and from the power plant to the individual injection wells. Gas pipelines will take gas contained in the brine from the gas separators either to the injection wells or to the gas scrubber at the power plant.
- Blowdown wells (2–4) at the power plant site to provide for injection of the cooling tower blowdown.

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- Pumps, tank, valves, controls, flow monitoring, and other necessary equipment to the wells and pipelines.
- Maintenance of the production and injection wells cited above.
- Piping, canals or ditches, and pumps to bring water from the Imperial Irrigation District's (IID's) Rockwood Canal to the power plant.
- A substation with a 2-mile-long double circuit 13.8 and 92 kilovolt (kV) transmission line with 66-foot-high poles to interconnect to the IID at the North Brawley 1 substation at Hovley Road and Andre Road. The transmission line will span the New River.
- The project will connect to the Brawley Wastewater Treatment Facility to receive tertiary treated water for cooling purposes.

It is anticipated that full implementation of the East Brawley Geothermal Development project would occur in three phases and span a total of 15 months.

The main entrance to the power plant would be off Best Road just north of Ward Road from a left-hand turn pocket built for this project. It would be necessary to cover Best Canal along the property frontage to accommodate widening of the road for the turn pocket. Emergency access would be from Best Road into the south end of the property on the north side of the Livesley Drain. The emergency access road would be constructed with an all-weather surface and lead to a locked gate that could be opened by any emergency responders. Both entrances into the plant site would provide access from the new State Route (SR) 111 bypass that would include an exit onto Best Road just south of Shank Road. Traffic would come from Interstate 8, north of SR 111 to Best Road.

The proposed project site is located in unincorporated Imperial County and is subject to the Imperial County General Plan and Land Use Ordinance. The proposed project site is currently designated on the Imperial County General Plan Land Use Map as Agriculture and Urban Area. The Land Use Ordinance designates the site as A2G, A2GU, A2R, A2RG, A3, A3G, AM2G, M, M1G, M2G, M2GU, M2N, and S1.

The following objectives have been identified for the proposed project:

- Develop and operate a geothermal project.
- Assist with meeting federal, state, and local clean and renewable energy goals.
- Assist with meeting state mandates under Assembly Bill 32 for greenhouse gases.

2.3 PROJECT ALTERNATIVES SUMMARY

California Environmental Quality Act (CEQA) Guidelines Section 15126.6 requires that an EIR describe a range of reasonable alternatives to the project which could feasibly attain the basic objectives of the project and reduce the degree of environmental impact. Section 6.0, Alternatives, provides a qualitative analysis of alternatives as compared to the proposed project. Alternatives identified for the proposed project include the following:

- Under Alternative 1, the No Project, No Build Alternative scenario, the proposed project site is assumed to remain in its current condition as undeveloped agricultural land.

- Under Alternative 2, the project uses reclaimed water from the City of Brawley, geothermal brine, and cooling tower blowdown to make up the balance of water needed for the project.
- Under Alternative 3, the project uses reclaimed water and groundwater to make up the balance of water needed for the project.
- Under Alternative 4, the project would use IID water for the project needs

2.4 AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

The following potential areas of controversy were identified during the NOP and Initial Study phases of environmental review of the proposed project:

- **Biological Impacts.** Public concerns regarding reduction of water supplies to the Salton Sea.
- **Utilities.** Public concerns regarding availability of water and water quality impacts associated with uses of groundwater for proposed project.

Concerns raised in response to the NOP were considered during the preparation of the Draft EIR. Comment letters are presented in **Appendix A** of this DEIR.

2.5 SUMMARY OF ENVIRONMENTAL IMPACTS

Table 2.0-1 presents a summary of project impacts and proposed mitigation measures that would avoid or minimize potential impacts. In the table, the level of significance of each environmental impact is indicated both before and after the application of the recommended mitigation measure(s).

For detailed discussions of all project impacts and mitigation measures, the reader is referred to the topical environmental analysis in Section 4.0.

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**TABLE 2.0-1
PROJECT IMPACTS AND PROPOSED MITIGATION MEASURES**

Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
4.1 Aesthetics			
Impact 4.1.1 Implementation of the proposed project is not anticipated to result in the alteration of a scenic vista.	LTS	None required.	LTS
Impact 4.1.2 Implementation of the proposed project would change the existing visual character of the project site and its surroundings.	LTS	None required.	LTS
Impact 4.1.3 Development of the proposed project would introduce new sources of light and glare, resulting in an increase in ambient light and glare levels.	PS	MM 4.1.3 All construction related lighting shall include shielding in order to direct lighting down and away from adjacent areas and consist of the minimal wattage necessary to provide safety at the construction site. The exterior finish of building materials shall be painted an earth-tone color to blend into the background. Exterior finishes shall be limited to non-reflective materials such as concrete, masonry, or stucco, though metal or synthetic wall panels with similar appearance to the aforementioned materials may also be acceptable as determined by the Planning and Development Services Department. <i>Timing/Implementation: Prior to the issuance of occupancy permits</i> <i>Enforcement/Monitoring: Imperial County Planning and Development Services Department</i>	LTS
Impact 4.1.4 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would alter the visual character of the area	LCC	None required.	LCC

N – No Impact **PS - Potentially Significant** **SU – Significant and Unavoidable** **LCC – Less than Cumulatively Considerable**
LTS – Less Than Significant **S - Significant** **PCC – Potentially Cumulative Considerable** **CC – Cumulatively Considerable**

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Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
		<p>all soil piles.</p> <p>d. Limit vehicle speed for all construction vehicles to a maximum of 15 mph on any unpaved surface at the construction site.</p> <p>e. Develop a trip reduction plan to achieve a 1.5 average vehicle ridership (AVR) for construction employees</p> <p><i>Timing/Implementation: Mitigation shall be implemented throughout project construction phase</i></p> <p><i>Enforcement/Monitoring: Imperial County Planning and Development Services Department</i></p> <p>MM 4.3.2b</p> <p>The following construction equipment control measures shall be implemented at the project site during all construction activities, when feasible:</p> <p>a. Use alternative-fueled or catalyst-equipped diesel construction equipment, including all off-road and portable diesel-powered equipment.</p> <p>b. Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes at a maximum.</p> <p>c. Limit, to the extent feasible, the hours of operation of heavy-duty equipment</p>	

N – No Impact **PS - Potentially Significant** **SU – Significant and Unavoidable** **LCC – Less than Cumulatively Considerable**
LTS – Less Than Significant **S - Significant** **PCC – Potentially Cumulative Considerable** **CC – Cumulatively Considerable**

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Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
<p>Impact 4.3.3 Operation of the proposed project would result in long-term emissions of criteria air pollutants from mobile and area sources that could violate or substantially contribute to an existing violation of one or more air quality standards.</p>	<p>PS</p>	<p>and/or the amount of equipment in use.</p> <p>d. Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set).</p> <p><i>Mitigation shall be implemented throughout project construction phase</i></p> <p><i>Timing/Implementation: Imperial County Planning and Development Services Department</i></p> <p><i>Enforcement/Monitoring: Imperial County Planning and Development Services Department</i></p> <p>MM 4.3.3a The proposed project shall be required to implement the use of a regenerative thermal oxidizer (RTO) unit and caustic scrubber system, which shall be used to abate the combustible noncondensable gas air pollutant emissions, during project operations. The RTO/scrubber system represents best available control technology for removal of H₂S and C₆H₆ in the noncondensable gas. In addition, the proposed project shall be required to implement the use of a maintenance vapor recovery unit to limit OEC unit emissions as well as high-efficiency drift eliminators to abate PM₁₀ emissions from the north and south cooling towers.</p> <p><i>Timing/Implementation: Ongoing</i></p> <p><i>Enforcement/Monitoring: Imperial County Planning and Development Services Department in coordination with the Imperial</i></p>	<p>SU</p>

N – No Impact **PS - Potentially Significant** **SU – Significant and Unavoidable** **LCC – Less than Cumulatively Considerable**
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Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
<p>Impact 4.3.4 Implementation of the proposed project would not be anticipated to contribute to localized concentrations of mobile-source CO that would exceed applicable ambient air quality standards.</p> <p>Impact 4.3.5 Project operations will result in low levels of hazardous air pollutant emissions in the vicinity of the project site.</p>	<p>LTS</p> <p>PS</p>	<p>MM 4.3.3b County Air Pollution Control District The proposed project shall be required to fulfill its obligations mandated in Imperial County Air Pollution Control District Rule 207.C.2.a in order to mitigate project air pollutants associated with ozone or PM₁₀ in excess of 137 pounds per day with the purchase of necessary ROC emission offset credits from one or more entities prior to the issuance of construction permits.</p> <p><i>Timing/Implementation: Prior to the issuance of grading permits</i> <i>Enforcement/Monitoring: Imperial County Planning and Development Services Department in coordination with the Imperial County Air Pollution Control District</i></p>	<p>LTS</p> <p>LTS</p>

N – No Impact **PS - Potentially Significant** **SU – Significant and Unavoidable** **LCC – Less than Cumulatively Considerable**
LTS – Less Than Significant **S - Significant** **PCC – Potentially Cumulative Considerable** **CC – Cumulatively Considerable**

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Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
<p>Impact 4.4.2 Implementation of the proposed East Brawley Geothermal Development project could result in direct and indirect loss of habitat and individuals of animal and plant species of concern, listed as “fully protected” in the California Fish and Game Code (Section 3511, 4700, 5050, 5515), migratory birds protected under the Migratory Bird Treaty Act, and other non-listed special-status species.</p>	PS	<p>radius of the New River.</p> <p><i>Timing/Implementation:</i> May 15 through August 15 if the species is detected</p> <p><i>Enforcement/Monitoring:</i> County of Imperial Planning and Development Services Department; USFWS; CDFG</p> <p>MM 4.4.2a</p> <p>For trees that must be removed to construct each phase of the proposed project, the project proponent will target the removal of trees and other vegetation to occur outside the nesting season between September 1 and February 28. If trees cannot be removed outside the nesting season, pre-construction surveys will be conducted prior to vegetation removal to verify the absence of active nests within 500 feet of construction activities.</p> <p>If construction or tree removal is proposed during the breeding/nesting season for local avian species (typically March 1 through August 31), a focused survey for active nests of raptors and migratory birds within and in the vicinity of (no less than 500 feet outside project boundaries, where possible) the project construction activities shall be conducted by a qualified biologist prior to each phase of development. Surveys shall include searches of all potential nest sites, including snags, shrubs, ground, buildings, and cliff faces. If no active nests</p>	LTS

N – No Impact
LTS – Less Than Significant

PS - Potentially Significant
S - Significant

SU – Significant and Unavoidable
PCC – Potentially Cumulative Considerable

LCC – Less than Cumulatively Considerable
CC – Cumulatively Considerable

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Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
		<p>breaking activity. The survey will identify dens for special-status mammals including Sierra Nevada red fox, California wolverine, and American badger. If active den/burrow sites for special-status mammals are identified, a mitigation plan shall be developed in consultation with the California Department of Fish and Game and/or U.S. Fish and Wildlife Service to ensure no animals are killed and that den/burrow sites are properly addressed. Measures may include, but are not limited to, enforcement of buffer zones restricting construction activities near den sites, and capture and relocation of the species. If active dens/burrows are present, they shall be monitored by a qualified biologist(s)/monitor(s) throughout construction to ensure no additional losses. If no active dens/burrows are found, then no further mitigation is necessary.</p> <p><i>Timing/Implementation: Two weeks prior to construction and/or grading activities</i></p> <p><i>Enforcement/Monitoring: County of Imperial Planning and Development Services Department</i></p> <p>MM 4.4.2c Worker Environmental Awareness Program. A worker environmental awareness program shall be established and implemented prior to construction to educate the construction crew on special-status species with the potential to occur in the area. The program shall include, at</p>	

**N – No Impact
LTS – Less Than Significant**

**PS - Potentially Significant
S - Significant**

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		<p>a minimum, species identification, a description of suitable habitat for this species, and measures to implement in the event that this species is found during construction. The program shall be presented to all members of the construction crew.</p> <p><i>Timing/Implementation:</i> Prior to any employee conducting work on the project site</p> <p><i>Enforcement/Monitoring:</i> County of Imperial Planning and Development Services Department</p> <p>MM 4.4.2d</p> <p>The following best management practices (BMPs) shall be implemented during construction to reduce impacts to special-status species and habitat:</p> <ul style="list-style-type: none"> • Limit construction equipment and associated activities to the project routes in areas that support sensitive resources. • To eliminate an attraction to predators of special-status species, all food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in solid, closed containers (trash cans) and removed at the end of each working day from the entire construction site. • Implement construction measures to avoid accidental transport and spread of invasive species including the 	

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		<p>160 feet) during the non-breeding season of September 1 through January 31 or within 75 meters (approximately 250 feet) during the breeding season of February 1 through August 31. Foraging habitat shall be permanently preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls or single unpaired resident bird, or as approved by CDFG.</p> <p>When destruction of occupied burrows is unavoidable, in order to offset the loss of foraging and burrow habitat, foraging habitat per pair or unpaired resident bird shall be permanently protected in a location and configuration acceptable to CDFG. New burrows shall be created at a ratio of 2:1 in the protected habitat, or as approved by CDFG.</p> <p>If owls must be moved away from the disturbance area, passive relocation techniques shall be used. Passive relocation shall incorporate the following guidance, subject to approval by CDFG: Owls should be excluded from burrows in the immediate impact zone and within a 50-meter (approximately 160 feet) buffer zone by installing one-way doors in burrow entrances. One-way doors should be left in place 48 hours to ensure owls have left the burrow before excavation.</p>	

Timing/Implementation: Prior to construction-related

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<p>Impact 4.4.5 The proposed project would potentially result in a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, riverine, irrigation canals, and seasonal wetland) through direct removal, filling, hydrological interruption, or other means.</p>	<p>PS</p>	<p>for removal of or disturbance to riparian habitat and waters of the United States (i.e., stream, lake, or river) from CDFG would also be required for the proposed project. This agreement will include measures to minimize and restore riparian habitat to pre-project conditions. The 1602 Streambed Alteration Agreement would require the project applicant to prepare and implement a riparian vegetation mitigation and monitoring plan for disturbed riparian vegetation.</p> <p><i>Timing/Implementation: Prior to the start of construction activities that disturb riparian habitat</i></p> <p><i>Enforcement/Monitoring: County of Imperial Planning and Development Services Department</i></p> <p>MM 4.4.5 The project applicant shall comply with the USACE “no net loss” policy for the mitigation of wetlands/waters under the jurisdiction of USACE. The applicant must apply for a Section 404 permit, a Section 401 permit, and a 1602 Streambed Alteration Agreement. If wetland resources are proposed to be taken, the project applicant shall do the following:</p> <ol style="list-style-type: none"> 1. If required, apply for a Section 404 permit from USACE after verification of the wetland delineation by USACE. Any waters of the U.S. that would be lost or disturbed shall be replaced or rehabilitated on a no net loss basis in accordance with the USACE 	<p>LTS</p>

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		<p>mitigation guidelines. On-site creation of wetland habitat is preferred to off-site mitigation. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods agreeable to the USACE.</p> <p>2. Obtain a Section 401 water quality waiver of certification from the RWQCB.</p> <p>3. A mitigation plan shall be implemented that includes <u>one</u> of the following:</p> <p>a. Completion of an on-site mitigation and monitoring plan that includes on-site creation/preservation of the wetlands/waters. This will include measures to avoid impacts to wetlands and habitat to be preserved such as fencing, best management practices to protect water quality, and other appropriate measures.</p> <p>b. Credits may be obtained at an approved mitigation bank.</p> <p>The project applicant shall provide written evidence to the County of Imperial from USACE and CRBRWQCB that this measure has been complied with prior to</p>	

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<p>Impact 4.4.6 Development of the project site would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.</p>	LTS	<p>project approval.</p> <p><i>Timing/Implementation:</i> Prior to the start of construction activities that would impact wetlands</p> <p><i>Enforcement/Monitoring:</i> County of Imperial Planning and Development Services Department</p>	LTS
<p>Impact 4.4.7 Implementation of the proposed project would not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or any adopted biological resources recovery or conservation plan of any federal or state agency.</p>	N	None Required.	N
<p>Impact 4.4.8 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in potential disturbance to special-status species and sensitive habitats throughout the region.</p>	PCC	Mitigation measures MM 4.4.1 through MM 4.4.5	LTS
<p>4.5 Cultural and Paleontological Resources</p>			
<p>Impact 4.5.1 Implementation of the proposed East Brawley Geothermal Development project could result in impacts to prehistoric resources within project boundaries.</p>	PS	<p>MM 4.5.1a If a Native American tribal monitor is available, the project applicant shall retain a Native American tribal monitor or Native American representative to be present during all excavation or other earth-moving activities within the East Brawley Geothermal Development project</p>	LTS

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		<p>The project applicant shall notify the Imperial County Planning and Development Services Department immediately if any prehistoric or historic resources are uncovered. All construction must stop in the vicinity of the find and an archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology shall be retained to evaluate the finds and recommend appropriate action. The archaeologist shall work in coordination with the Native American tribal monitor or representative.</p> <p>Imperial County and the project applicant shall consider mitigation recommendations presented by a professional archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology for any unanticipated discoveries. Imperial County and the project applicant shall consult and agree upon implementation of a measure or measures that Imperial County and the project applicant deem feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. The project proponent shall be required to implement any mitigation necessary for the protection</p>	

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<p>Impact 4.5.2 Construction activities associated with</p>	<p>PS</p>	<p>of cultural resources.</p> <p><i>Timing/Implementation:</i> As a condition of project approval, and implemented during ground-disturbing construction activities</p> <p><i>Enforcement/Monitoring:</i> Imperial County Planning and Development Services Department</p> <p>MM 4.5.1b</p> <p>During all excavation or other earth-moving activities within the East Brawley Geothermal Development project area, should human remains be discovered, all work must stop in the immediate vicinity of the find, the Imperial County Planning and Development Services Department shall be notified immediately, and the County Coroner must be notified according to Section 7050.5 of the California Health and Safety Code. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed.</p> <p><i>Timing/Implementation:</i> As a condition of project approval, and implemented during ground-disturbing construction activities</p> <p><i>Enforcement/Monitoring:</i> Imperial County Planning and Development Services</p>	<p>LTS</p>

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<p>implementation of the proposed project could result in impacts to undiscovered paleontological resources.</p>		<p>discovered during ground-disturbing project activity within the project area, all work in the immediate vicinity must stop and the project applicant shall notify the Imperial County Planning and Development Services Department immediately. A qualified paleontologist shall be retained to evaluate the finds and recommend appropriate mitigation measures for the inadvertently discovered paleontological resources.</p> <p>Imperial County and the project applicant shall consider the mitigation recommendations of the qualified paleontologist for any unanticipated discoveries. Imperial County and the project applicant shall consult and agree upon implementation of a measure or measures that Imperial County and the project applicant deem feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. The project proponent shall be required to implement any mitigation necessary for the protection of paleontological resources.</p> <p><i>Timing/Implementation:</i> As a condition of project approval, and implemented during ground disturbing construction activities.</p> <p><i>Enforcement/Monitoring:</i> Imperial County Planning Department</p>	

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Impact 4.5.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could result in impacts to prehistoric resources, historic resources, and human remains.	PCC	Mitigation measures MM 4.5.1a and MM 4.5.1b	LCC
Impact 4.5.4 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could result in the potential disturbance of paleontological resources (i.e., fossils and fossil formations).	PCC	Mitigation measure MM 4.5.2	LCC
4.6 Geology and Soils			
Impact 4.6.1 The proposed project does not contain any known earthquake fault lines.	LTS	None required.	LTS
Impact 4.6.2 The project site is located in a seismically active area.	PS	<p>MM 4.6.2 Prior to design and construction of the proposed project, site-specific geotechnical investigations shall be performed, including subsurface exploration and laboratory testing. If any potential seismic hazards exists for the potential for ground-shaking through the geotechnical investigations, measures such as regrading, grout injection, or deep dynamic compression shall be incorporated into the site design and implemented during project construction to reduce potential hazards to a less than significant level, in accordance with CBC standards.</p> <p><i>Timing/Implementation: Prior to approval of improvement</i></p>	LTS

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		<p><i>plans</i></p> <p><i>Enforcement/Monitoring: Imperial County Department of Public Works and Department of Planning and Development Services</i></p>	
<p>Impact 4.6.3 The risk of seismically induced liquefaction is low due to the depth of groundwater underlying the project site. However, some seismically induced settlement of the dry sands could occur.</p>	LTS	None required.	LTS
<p>Impact 4.6.4 Development of the proposed project may require excavation and grading that could result in soil erosion and loss of topsoil during construction.</p>	PS	Implement mitigation measures MM 4.8.1 and MM 4.3.2a .	LTS
<p>Impact 4.6.5 The proposed project is not located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.</p>	LTS	None required.	LTS
<p>Impact 4.6.6 The proposed project is located on expansive clay soils.</p>		<p>MM 4.6.6 During project grading and filling activities, native clay soils should be placed as fill only in nonstructural areas. The project proponent shall adhere to the following recommendations as provided in the geotechnical investigation:</p>	

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		<p align="center">TABLE 4.6-3 SPECIFICATION FOR IMPORTED STRUCTURAL FILL</p> <table border="1"> <thead> <tr> <th>General Plan Policies</th> <th>Consistency with General Plan</th> <th>Analysis</th> </tr> </thead> <tbody> <tr> <td> <p>– Seismic and Geologic Hazards Program: Implement ordinances and codified procedures which require the review and restriction of land use due to possible natural hazards. Ensure that no structure for human occupancy, other than one-story wood frame structures, shall be permitted within fifty feet of an active fault trace as</p> </td> <td> <p>Yes, with mitigation</p> </td> <td> <p>A geotechnical report has been prepared by Black Eagle Consultants, Inc. for the proposed project, which includes safety considerations in land use planning. The geotechnical report has been referenced in this environmental document, and the report's recommended measures to mitigate potential geologic or seismic hazards that may be associated with the proposed project have been incorporated into this DEIR. Since the project site is located in a seismically active area, all proposed structures are required to be designed in accordance with the California Building Code (CBC) for near</p> </td> </tr> </tbody> </table>	General Plan Policies	Consistency with General Plan	Analysis	<p>– Seismic and Geologic Hazards Program: Implement ordinances and codified procedures which require the review and restriction of land use due to possible natural hazards. Ensure that no structure for human occupancy, other than one-story wood frame structures, shall be permitted within fifty feet of an active fault trace as</p>	<p>Yes, with mitigation</p>	<p>A geotechnical report has been prepared by Black Eagle Consultants, Inc. for the proposed project, which includes safety considerations in land use planning. The geotechnical report has been referenced in this environmental document, and the report's recommended measures to mitigate potential geologic or seismic hazards that may be associated with the proposed project have been incorporated into this DEIR. Since the project site is located in a seismically active area, all proposed structures are required to be designed in accordance with the California Building Code (CBC) for near</p>	
General Plan Policies	Consistency with General Plan	Analysis							
<p>– Seismic and Geologic Hazards Program: Implement ordinances and codified procedures which require the review and restriction of land use due to possible natural hazards. Ensure that no structure for human occupancy, other than one-story wood frame structures, shall be permitted within fifty feet of an active fault trace as</p>	<p>Yes, with mitigation</p>	<p>A geotechnical report has been prepared by Black Eagle Consultants, Inc. for the proposed project, which includes safety considerations in land use planning. The geotechnical report has been referenced in this environmental document, and the report's recommended measures to mitigate potential geologic or seismic hazards that may be associated with the proposed project have been incorporated into this DEIR. Since the project site is located in a seismically active area, all proposed structures are required to be designed in accordance with the California Building Code (CBC) for near</p>							

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	<p>designated on maps compiled by the State Geologist under the Alquist-Priolo Geologist Hazards Zone Act.</p>		<p>source factors derived from a design basis earthquake. In addition, appropriate mitigation measures have been incorporated into this DEIR to reduce risks associated with seismic hazards.</p> <p>The project site is not located within any Alquist-Priolo Earthquake Fault Zones as shown on the Index to Earthquake Fault Zone Map (Black Eagle 2008).</p>	
	<p>Objective 2.10 Reduce the risk of damage due to subsidence resulting from extraction of groundwater and geothermal resources by appropriate regulation.</p>	<p>Yes, with mitigation</p>	<p>The project would participate in the Imperial County Subsidence Detection Program.</p>	
<p><i>Timing/Implementation: Prior to approval of improvement plans</i></p> <p><i>Enforcement/Monitoring: Imperial County Department of</i></p>				

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		<p>construction sites. The proposed project shall include staging areas where materials shall be stored during construction.</p> <p><i>Timing/Implementation:</i> Prior to issuance of a recorded conditional use permit</p> <p><i>Enforcement/Monitoring:</i> Imperial County Planning and Development Services Department, Imperial County Fire Department, and California Department of Toxic Substances Control (DTSC), as the Certified Unified Program Agency (CUPA) for Imperial County</p> <p>MM 4.7.1b</p> <p>A comprehensive Emergency Response Plan (ERP) shall be prepared for the East Brawley Geothermal Development project. Local emergency response providers shall be consulted regarding the Emergency Response Plan (ERP) and shall be provided copies of the document for their review. Approval of this ERP will be required by the Imperial County Sheriff's Office, Imperial County Office of Emergency Services, Imperial County Fire Department, Imperial County Department of Public Health, California Highway Patrol, and Caltrans prior to the commencement of site operations. The ERP shall address potential safety hazards associated with the project and identify public safety hazards that can be reduced or eliminated through specific protocols. The ERP also shall provide an overview of</p>	

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		<p>general procedures required to protect people and property during an emergency or disaster situation. The intent of the ERP is to establish a clear understanding of responsibilities for first responders, sheriff and police, local fire departments, emergency medical service agencies, and management of staff during an emergency situation.</p> <p>The ERP shall identify and assign personnel to various emergency tasks and responsibilities, thus creating a site emergency team. The ERP shall describe the emergency management procedures to cover possible emergencies (i.e., well blowouts, major fluid spills, earthquakes, etc.). There shall be at least one employee on call at all times (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility of coordinating all emergency response measures. The on-call emergency coordinator would be familiar with the ERP and would have the authority to commit the resources needed to carry out the contingency plan. Additionally, the ERP shall include designated assignments for on-site personnel, details of each position's responsibilities, procedures for coordination with outside resources, and establishment of a chain of command to take precedence in emergencies.</p>	

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<p>Impact 4.7.2 Implementation of the proposed project would require the transport of various substances, some of which are flammable. This transport could pose a significant hazard should an accident involving the substances occur.</p>	LTS	<p>The Emergency Response Plan shall be updated annually in coordination with the Imperial County Fire Department, Public Health Department, the Imperial County Certified Unified Program Agency, and the Imperial County Office of Emergency Services.</p> <p><i>Timing/Implementation: Prior to issuance of a recorded conditional use permit</i></p> <p><i>Enforcement/Monitoring: Imperial County Department of Planning and Development Services</i></p>	LTS
<p>Impact 4.7.3 Implementation of the proposed project may create a significant hazard to the public or environment in the event of an accident involving the release of hazardous materials into the environment.</p>	LTS	None required.	LTS
<p>Impact 4.7.4 The nearest airport is approximately 1.3 miles from the project site. The project is not located within the flight path. The airport activities do not present a hazard to the proposed project's employees. However, future drilling wells may be located closer to the airport.</p>	PS	<p>MM 4.7.4 For future drilling activities within the East Brawley Geothermal Development project area, the project applicant(s) shall receive a Determination of No Hazard to Air Navigation from the Federal Aviation Administration for the drilling of additional wells.</p> <p><i>Timing/Implementation: Prior to issuance of conditional use</i></p>	LTS

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Impact 4.7.5 The project is not located near a private airstrip. Therefore, implementation of the proposed project would not result in a safety hazard for people residing or working in the project area.	N	Enforcement/Monitoring: <i>Project applicant; Imperial County Planning and Development Services Department.</i> <i>permits for the wells</i>	N
Impact 4.7.6 Implementation of the proposed East Brawley Geothermal Development project would lead to increases in demand for fire and police services, as discussed in Section 4.11, Public Services.	LTS	None required.	LTS
Impact 4.7.7 The project site is located in a relatively rural area. However, most of the site is currently irrigated for agricultural production or is fallow with little vegetation present.	LTS	None required.	LTS
Impact 4.7.8 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could increase the risk of public exposure to hazardous materials.	LCC	None required.	LCC
4.8 Hydrology and Water Quality			
Impact 4.8.1 Buildout of the proposed East Brawley Geothermal Development project area could result in soil disturbance associated with construction activities and other aspects of construction, resulting in accelerated erosion and sedimentation or the release of other pollutants to local waterways.	PS	MM 4.8.1 The project applicant shall prepare a stormwater pollution and prevention plan (SWPPP) to be administered during grading and project construction. The SWPPP must incorporate best management practices (BMPs) meeting technical standards of the General Construction permit to ensure that	LTS

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<p>Impact 4.8.2 Buildout of the proposed East Brawley Geothermal Development project area would introduce impervious surfaces and structures to the project site, resulting in increased runoff and additional pollutants.</p>	<p>PS</p>	<p>potential water quality impacts (including on- and off-site erosion) during construction phases are minimized and that a violation of water quality standards does not occur. The SWPPP must address spill prevention and include a countermeasure plan describing measures to ensure proper collection and disposal of all pollutants handled or produced on the site during construction, including sanitary wastes, cement, and petroleum products. BMPs included in the SWPPP must be consistent with the California Stormwater Best Management Practices Handbook for Construction. The SWPPP must be submitted to the Colorado River Basin Regional Water Quality Control Board, Region 7, and to the County for review prior to the issuance of grading permits.</p> <p>Timing/Implementation: Prior to issuance of grading permits</p> <p>Enforcement/Monitoring: Project applicant; CRBRWQCB</p> <p>MM 4.8.2 Stormwater drainage from on-site impervious surfaces (including roads) shall be collected and routed through specifically designed water quality treatment facilities for removal of pollutants of concern (e.g., sediment, oil/grease), as approved by the Imperial County Department of Planning and Development Services. As part of the Improvement Plans, the project applicant shall verify that the proposed stormwater</p>	<p>LTS</p>

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<p>Impact 4.8.3 Buildout of the proposed East Brawley Geothermal Development project area would result in an increase in impervious surface area that could result in alteration of existing on-site drainage patterns and contributions to substantial runoff exceeding existing stormwater capacity.</p>	PS	<p>retention basin and sumps/containment basins are appropriate to treat the pollutants of concern from this project.</p> <p>Timing/Implementation: Prior to issuance of grading permits</p> <p>Enforcement/Monitoring: Project applicant; Imperial County Department of Planning and Development Services</p>	LTS
<p>Impact 4.8.4 Conversion of the project site from agricultural to commercial uses may cause groundwater levels to fluctuate and could affect recharge.</p>	LTS	None required.	LTS
<p>Impact 4.8.5 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would contribute to the cumulative effects of degradation of water quality, changes to runoff patterns, and the potential for increased flooding.</p>	PCC	Mitigation measures MM 4.8.1 and MM 4.8.2	LCC
4.9 Land Use			
<p>Impact 4.9.1 The proposed East Brawley Geothermal Development project is consistent with the County of Imperial General Plan and Land Use Ordinance. The proposed project is also</p>	LTS	None required.	LTS

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Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
<p>required to be consistent with General Plan and Land Use Ordinance standards.</p> <p>Impact 4.9.2 The proposed project would develop a geothermal power plant and associated pipelines and wells, which will temporarily increase the intensity of land use on the project site and would place industrial development in an area of unincorporated Imperial County that is predominantly agricultural.</p>	PS	<p>MM 4.9.2a The project applicant shall prepare a Construction Notification Plan. Forty-five days (45) prior to construction, the project applicant shall prepare and submit the Construction Notification Plan to the County of Imperial for approval. The plan shall identify the procedures the applicant will use to inform property owners of the location and duration of construction, identify approvals that are needed prior to posting or publication of construction notices, and include text of proposed public notices and advertisements.</p> <p><i>Timing/Implementation: Forty-five (45) days prior to construction</i></p> <p><i>Enforcement/Monitoring: County of Imperial Department of Planning and Development Services</i></p> <p>MM 4.9.2b A public notice mailer shall be prepared and mailed no less than 15 days prior to construction. The notice shall identify construction activities that would restrict, block, remove parking, or require a detour to access existing residential properties. The notice shall state the type of construction activities that will be conducted and the location and duration of construction. The applicant shall mail the notice to all residents or property owners within 1,000 feet of the project site and to any property owners or tenants</p>	LTS

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2.0 EXECUTIVE SUMMARY

Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
<p>Impact 4.9.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in development that would change existing land uses patterns and intensity.</p>	LCC	<p>that could be impacted by construction activities. If construction delays of more than seven days occur, additional noticing shall be required to the public and local and state agencies.</p> <p><i>Timing/Implementation: No less than 15 days prior to construction</i></p> <p><i>Enforcement/Monitoring: County of Imperial Department of Planning and Development Services</i></p>	LCC
<p>4.10 Noise</p>			
<p>Impact 4.10.1 During the construction phases, implementation of the proposed project could result in temporary increased noise levels that may exceed Imperial County standards at adjacent noise-sensitive receptors off-site. The project proposes to implement best management practices to reduce noise levels including the minimization of unnecessary construction vehicle use and idling time.</p>	LTS	None required.	LTS
<p>Impact 4.10.2 Implementation of the proposed project would not result in a substantial increase in ambient noise levels at off-site noise-sensitive receptors or exceed the Imperial County standards for exterior noise levels.</p>	LTS	None required.	LTS
<p>Impact 4.10.3 The proposed project, in combination with approved, proposed, and other reasonably</p>	LCC	None required.	LCC

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Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
<p>foreseeable projects in the cumulative study area, would increase ambient noise but would not exceed the 3 dBA threshold.</p>			
4.11 Public Services			
<p>Impact 4.11.1.1 Circulation and access to the site and surrounding parcels are not anticipated to be hindered during project construction or operation. Therefore, the project is not anticipated to affect emergency response times.</p>	LTS	None required.	LTS
<p>Impact 4.11.1.2 Implementation of the proposed East Brawley Geothermal Development project would result in an increase in demand for fire protection services over existing levels. However, the project design features include fire prevention and suppression features.</p>	PS	<p>MM 4.11.1.2a The project applicant shall be required to pay a fair share contribution for additional fire facilities, equipment, and staff. Construction of such facilities and the structure(s) size, amount of equipment, and personnel required for these services shall be determined in consultation with the Imperial County Fire Department.</p> <p><i>Timing/Implementation: Prior to the initiation of any site development or ground-breaking activities</i></p> <p><i>Enforcement/Monitoring: Imperial County Fire Department; County of Imperial Planning and Development Services Department</i></p> <p>MM 4.11.1.2b The Fire Impact Fees shall be imposed pursuant to Ordinance 1418 Section 2 (2006), which was drafted in accordance with the County's TischlerBise Impact Fee Study (TischlerBise, 2006). The value of the impact fees for each proposed project shall be assessed using the formula derived in the study. Specifically, impact</p>	LTS

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2.0 EXECUTIVE SUMMARY

Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
		<p>Fees for nonresidential development shall be calculated on a per-employee basis. The Fire Impact Fees shall be calculated based on the cost of maintaining the County's current level of service to residential and nonresidential development. Fees collected shall only be used to mitigate the conditions created by the development, and such fees shall only be expended on facilities for which the fees were levied. This ensures that Fire Impact Fees will be used only to mitigate the impacts on fire service capabilities.</p> <p><i>Timing/Implementation: Prior to the initiation of any site development or ground-breaking activities</i></p> <p><i>Enforcement/Monitoring: Imperial County Fire Department; County of Imperial Planning and Development Services Department</i></p>	
<p>Impact 4.11.1.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase demand for fire and emergency medical services.</p>	PCC	<p>Implementation of mitigation measures MM 4.7.1a, MM 4.7.1b and MM 4.11.1.2</p>	LCC
<p>Impact 4.11.2.1 Circulation and access to the site and surrounding parcels are not anticipated to be hindered during project construction and operation in a way that would affect law enforcement response times.</p>	LTS	None required.	LTS
<p>Impact 4.11.2.2 Development of the proposed project would minimally increase the intensity of use on the project site, thereby increasing the chances of</p>	LTS	None required.	LTS

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Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
requiring police protection.			
Impact 4.11.2.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase demand for law enforcement services.	LCC	None required.	
Impact 4.11.3.1 Implementation of the proposed project would result in an increase in solid waste generation and the demand for waste disposal. Based on the nature of the project as a geothermal power plant, the proposed project is not anticipated to produce substantial amounts of solid waste that would adversely affect landfill capacity.	LTS	None required.	LTS
Impact 4.11.3.2 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase solid waste generation and demand for landfill capacity. However, Imperial County has implemented its Countywide Integrated Waste Management Plan, and adequate capacity is available at landfills that serve the county.	LCC	None required.	LCC
4.12 Transportation and Circulation			
Impact 4.12.1 Buildout of the proposed project would result in increased project-related traffic volumes, which are not predicted to result in increased delays and deterioration in levels of service at area intersections and street segment operations.	LTS	None required.	LTS
Impact 4.12.2 Buildout of the proposed project would result in increased construction-related traffic volumes, which are not expected to result in increased	LTS	None required.	LTS

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Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
delays and deterioration in levels of service at area intersections and street segment operations.			
Impact 4.12.3 Buildout of the proposed project would not result in the construction of new access roads or traffic improvements, which could increase hazards.	LTS	None required.	LTS
Impact 4.12.4 Buildout of the proposed project would result in the construction new private roads and improvements to existing roadways consistent with adopted policies, plans, and programs for alternative transportation.	LTS	None required.	LTS
Impact 4.12.5 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in increased traffic volumes that are not expected to result in increased delays or deterioration of levels of service at area intersections or roadway segments.	LCC	None required.	LCC
4.13 Utilities and Service Systems			
Impact 4.13.1.1 Water obtained from the Brawley Wastewater Treatment Plant (WWTP) would require tertiary level treatment prior to use as cooling makeup water at the proposed geothermal plant. As such, upgrades at the WWTP will be required.	LTS	None Required.	LTS
Impact 4.13.1.2 The proposed project would have a total water demand of approximately 5,500 acre-feet per year, which would be obtained from IID and the City of Brawley's Wastewater Treatment Plant. According to the water supply assessment (DDE 2010), adequate water supplies and entitlements are available to serve the proposed project.	LTS	None Required.	LTS

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Impact	Level of Significance Without Mitigation	Mitigation Measure	Resulting Level of Significance
Impact 4.13.1.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase demand for water from IID. However, IID will have sufficient water supplies from existing entitlements to serve future growth.	LTS	None Required.	LTS
Impact 4.13.2.1 The proposed project would generate demand for sewage treatment in an area that is not currently served by a sewer district and would require the construction of an on-site septic system.	LTS	None Required.	LTS
Impact 4.13.2.2 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could increase demand for wastewater treatment services.	LCC	None Required.	LCC
Impact 4.13.3.1 The project site is currently provided electric service by IID Energy. The proposed project's anticipated power demands would not require improvements to IID's distribution system.	LTS	None Required.	LTS
Impact 4.13.3.2 The proposed project would not require the extension of telephone service infrastructure.	LTS	None Required.	LTS
Impact 4.13.3.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase demand for electric service. However, the proposed project would not require improvements to IID Energy's distribution system and would not contribute significantly to this cumulative impact.	LCC	None Available.	LCC

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3.0 PROJECT DESCRIPTION

The East Brawley Geothermal Development project proposes a privately owned 49.9 net megawatt geothermal power plant north of the City of Brawley in unincorporated Imperial County. This section of the Draft Environmental Impact Report (Draft EIR or DEIR) has been prepared in compliance with State CEQA Guidelines Section 15124, which details the requirements and contents of an EIR project description under the California Environmental Quality Act (CEQA).

3.1 REGIONAL AND LOCAL SETTING

PROJECT LOCATION

The proposed East Brawley Geothermal Development project is located in the unincorporated area of Imperial County, north of the City of Brawley (see **Figure 3.0-1**). The plant site is located east of State Route (SR) 111 and north of SR 78. The Del Rio Country Club is south of the project site. The eastern boundary of the project is Dietrich Road and Rutherford Road is to the north. A majority of the project site is located along Best Road from Shank to Rutherford roads. An at-grade intersection has been built at the SR 111 bypass and Best Road, which will provide access to the project. Well pads may be accessed from other County roads in the vicinity, such as Dietrich Road, Groshen Road, Rutherford Road, Ward Road, and Wills Road. The project site is located in the Westmorland and Wiest quadrangles. The plant site is located in the Westmorland Quadrangle. Development of the project would occur in Sections 10, 11, 14, 15, 16, 21, 22, and 23, Township 13 South, Range 14 East, San Bernardino Base and Meridian (see **Figure 3.0-2**).

PROJECT SITE CONDITIONS

The project site is located in the Imperial Valley area, which is the south-central part of Imperial County, and is bounded by Mexico on the south, the Algodones Sand Hills on the east, the Salton Sea on the north, San Diego County on the northwest, and the alluvial fans bordering the Coyote Mountains and the Yuha Desert to the southwest. The Imperial Valley area encompasses a total of 989,450 acres. Imperial Valley land that is irrigated for agriculture consists of 512,163 acres. The developed area, which includes Imperial County's incorporated cities, unincorporated communities, and supporting facilities, comprises approximately 1 percent of Imperial County's area. The Salton Sea accounts for approximately 7 percent of Imperial County's surface area (DDE 2009). The project site is located within the Salton Sea watershed, within the Imperial Hydrologic Unit and the Brawley Hydrologic Area.

The East Brawley Geothermal Development project site is relatively level at an elevation of about 142 feet below mean sea level (msl). The regional ground surface slopes toward the northeast at 12 feet per mile, or a 0.2 percent gradient. The project is bounded on the west by the New River, which is also the nearest surface water body.

According to the Phase I Environmental Site Assessment (Environ 2008, p. 1) prepared for the plant site, there are six plugged and abandoned geothermal temperature gradient wells in the project area, one plugged and abandoned dry hole on the site, one converted injection well outside the project boundaries, and four geothermal temperature gradient wells just outside the project area. There was farm equipment that was located along the southern portion of the project site, which was removed in 2009. The site consists of agricultural and undeveloped land, several residential dwelling units associated with agricultural activities, a golf course, a radio tower, and a cattle feedlot. The majority of the site comprises active agricultural lands, used mainly for growing alfalfa. A portion of the cattle feedlot is located near the northwestern portion of the site at the intersection of Kershaw Road and Rutherford Road (see **Figure 3.0-3**).

3.0 PROJECT DESCRIPTION

The following improved roads align north-south through the project site: Best Road, Groshen Road, Wells Road, and Dietrich Road. The following improved roads align east-west through the project site: Ward Road, Baum Road, Moorhead Drive, Shank Road, and Kershaw Road. Several irrigation canals align adjacent to the roads.

A review of historic site photos and topographic maps was conducted as part of the Phase I study prepared for the project. Aerial photographs in 1943 show scattered structures, most likely residential or agriculturally related buildings, visible in some areas.

The project site has the potential to impact burrowing owls during site-disturbing activities. No other threatened, endangered, or sensitive plant or animal species have the potential to be significantly impacted by the proposed project. Additional discussion of the site's biological resources can be found in Section 4.4, Biological and Natural Resources, of the DEIR.

Geologically, the proposed project site is situated in the Salton Trough, a 3,100-square-mile structural depression that extends from the Transverse Range on the north to the Gulf of California on the south and from the Peninsular Range on the west to the Colorado River on the east. The Colorado River delta, which lies perpendicular to the Salton Trough, establishes a closed northern basin that encompasses the Salton Sea and the Imperial Valley.

According to the cultural report for the project area, the site is located in an area of no known cultural resources with significance.

The geothermal plant site is owned by Ormat Nevada Inc., aka ORNI 19, LLC, and consists of one parcel of 33.7 acres. There are 39 leased parcels encompassing approximately 3,033.2 acres that will contain proposed wells and pipelines (see **Table 3.0-1**). The total area of disturbance for the project site is approximately 188.75 acres, which includes both the plant site and the wells and pipelines.

**TABLE 3.0-1
EAST BRAWLEY GEOTHERMAL ASSESSOR'S PARCEL NUMBERS, EXISTING LAND USE ORDINANCE DESIGNATION,
GENERAL PLAN LAND USE, AND ACREAGE**

Item	APN	Land Use Ordinance	General Plan	Acres
Geothermal Plant Site				
1	037-140-006	A-2-G	Agriculture	33.7
Wells and Pipelines				
2	037-090-006	A-2-G	Agriculture	10.4
		A-3-G		17.2
3	037-100-001	A-3-G	Agriculture	50.9
		M-2-G		19.2
4	037-100-003	A-3-G	Agriculture	41.6
5	037-100-004	A-3-G	Agriculture	6.1
		M-1-G		3.9
		M-2-G		2.4
6	037-100-005	A-3-G	Agriculture	13.1
		M-1-G		14.4

3.0 PROJECT DESCRIPTION

Item	APN	Land Use Ordinance	General Plan	Acres
7	037-100-006	A-2-G A-3-G	Agriculture	41.8 38.5
8	037-100-007	A-3-G	Agriculture	79.8
9	037-100-009	A-2-G	Agriculture	51.97
10	037-110-004	A-2-G A-3-G	Agriculture	45.9 46.0
11	037-110-005	A-2-G	Agriculture	3.0
12	037-110-007	A-3-G	Agriculture	79.6
13	037-110-009	A-2-G A-3-G	Agriculture	20.7 31.3
14	037-110-015	A-2-G	Agriculture	15.5
15	037-110-016	A-2-G	Agriculture	59.5
16	037-120-030	A-2-R-G	Agriculture	79.2
17	037-120-031	A-2-R-G	Agriculture	79.2
18	037-140-002	A-2-G	Agriculture	328.2
19	037-140-005	A-2-G	Agriculture	93.5
20	037-140-009	A-2-G	Agriculture	79.9
21	037-140-011	City of Brawley	Agriculture	9.6
22	037-140-013	A-2-G	Agriculture	77.7
23	037-140-014	A-2-G	Agriculture	80.0
24	037-140-015	A-2-G	Agriculture	80.0
25	037-140-017	City of Brawley	Agriculture	29.2
26	037-140-019	A-2-G	Agriculture	99.9
29	037-150-015	A-2-R-G	Agriculture	159.7
30	037-150-018	A-2-R-G	Agriculture	4.7
31	037-150-019	A-2-R-G	Agriculture	312.6
32	037-160-015	A-2-G	Agriculture	239.3
33	037-160-016	A-2-G-U	Agriculture	39.9
34	037-160-017	A-2-G-U	Agriculture	39.6
35	037-160-019	A-2-G-U	Agriculture	77.6
36	037-160-021	A-2-G-U	Urban	49.4

3.0 PROJECT DESCRIPTION

Item	APN	Land Use Ordinance	General Plan	Acres
37	037-160-027	A-2-G-U	Urban	6.6
		M-2-G-U		0.9
		S-1-G-U		123.3
38	037-160-069	City of Brawley	Urban	9.9
		M-2-G-U		1.1
39	037-180-009	A-3-G	Agriculture	80.2
40	037-180-011	A-3-G	Agriculture	159.2
Total Acreage				3,066.9

CURRENT AND SURROUNDING LAND USES

A majority of the East Brawley Geothermal Development project area is currently designated as A-2-U and is primarily defined as suitable for agricultural uses (limited) and agricultural-related compatible uses (see **Figure 3.0-4**). Permitted uses in the A-2-G zone include oil, gas, and geothermal exploration. The geothermal plant site is located on Best Road, between Ward Road and Baum Road, and is surrounded by agricultural lands. It is also subject to the Imperial County General Plan and Land Use Ordinance, and within the Geothermal Overlay Zone. The proposed well locations for the plant are also located on agricultural lands. Due west of the project is the Brawley Wastewater Treatment Plant (BWWTP). South of the project site is actively cultivated farmland. The New River runs west of the project site, beyond the agricultural land. The Del Rio Country Club and the City of Brawley are southwest of the project area. Best Road aligns north-south along the eastern side of the plant site. The plant site is bordered to the north by Field Road, on the east by the concrete-lined Best Lateral, on the south by an Imperial Irrigation District (IID) drain, and on the west by a dirt road that parallels the southwest- to northeast-trending tracks of the Union Pacific Railroad (see **Figure 3.0-2**).

T:_GIS\IMPERIAL_COUNTY\WAXD\NORMATT\GEO\HERMAL\FIG 1 REGIONAL.MXD - 11/15/2019 @ 12:16:52 PM

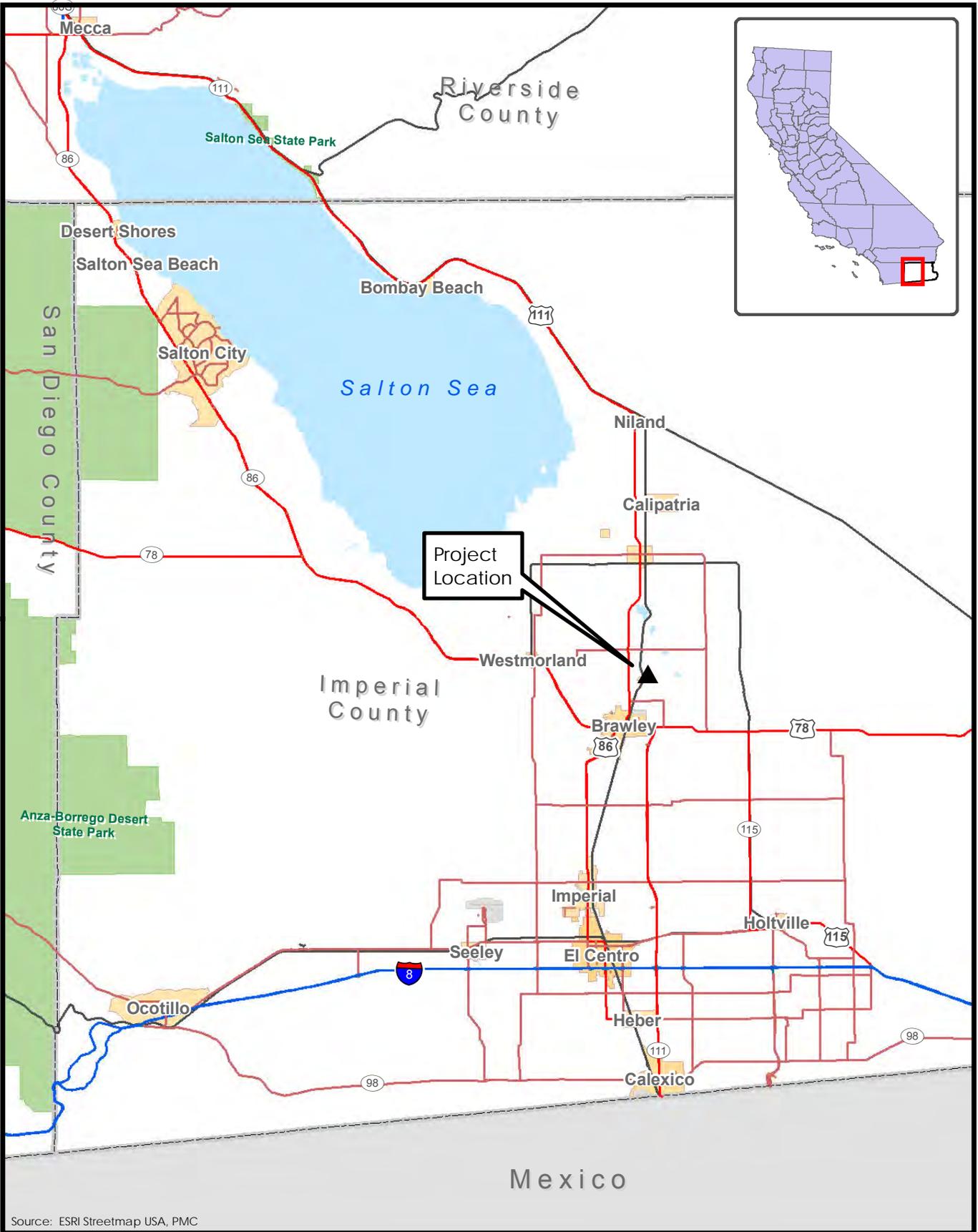


Figure 3.0-1
Regional Vicinity Map



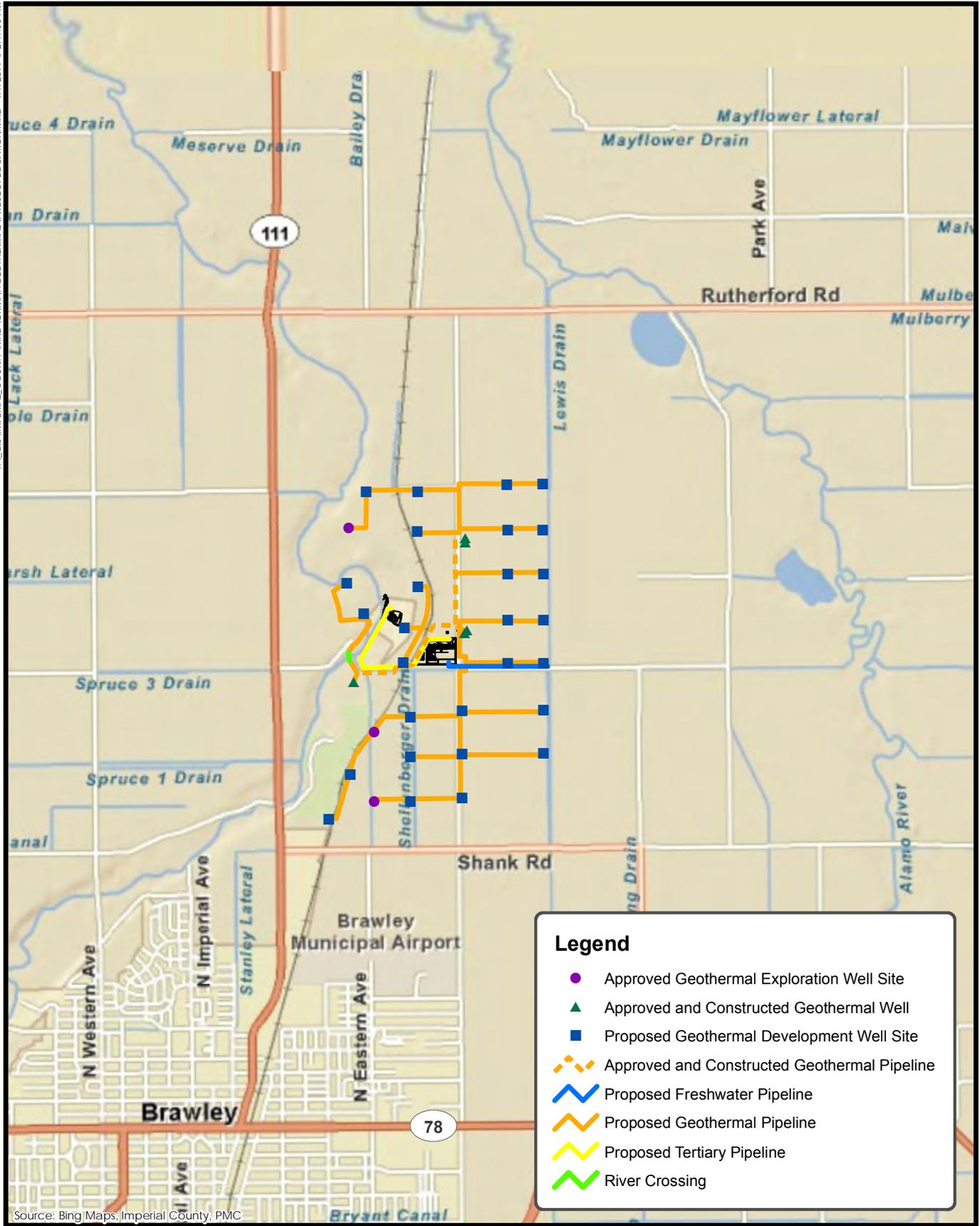


Figure 3.0-2
Project Location

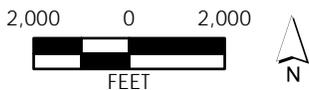
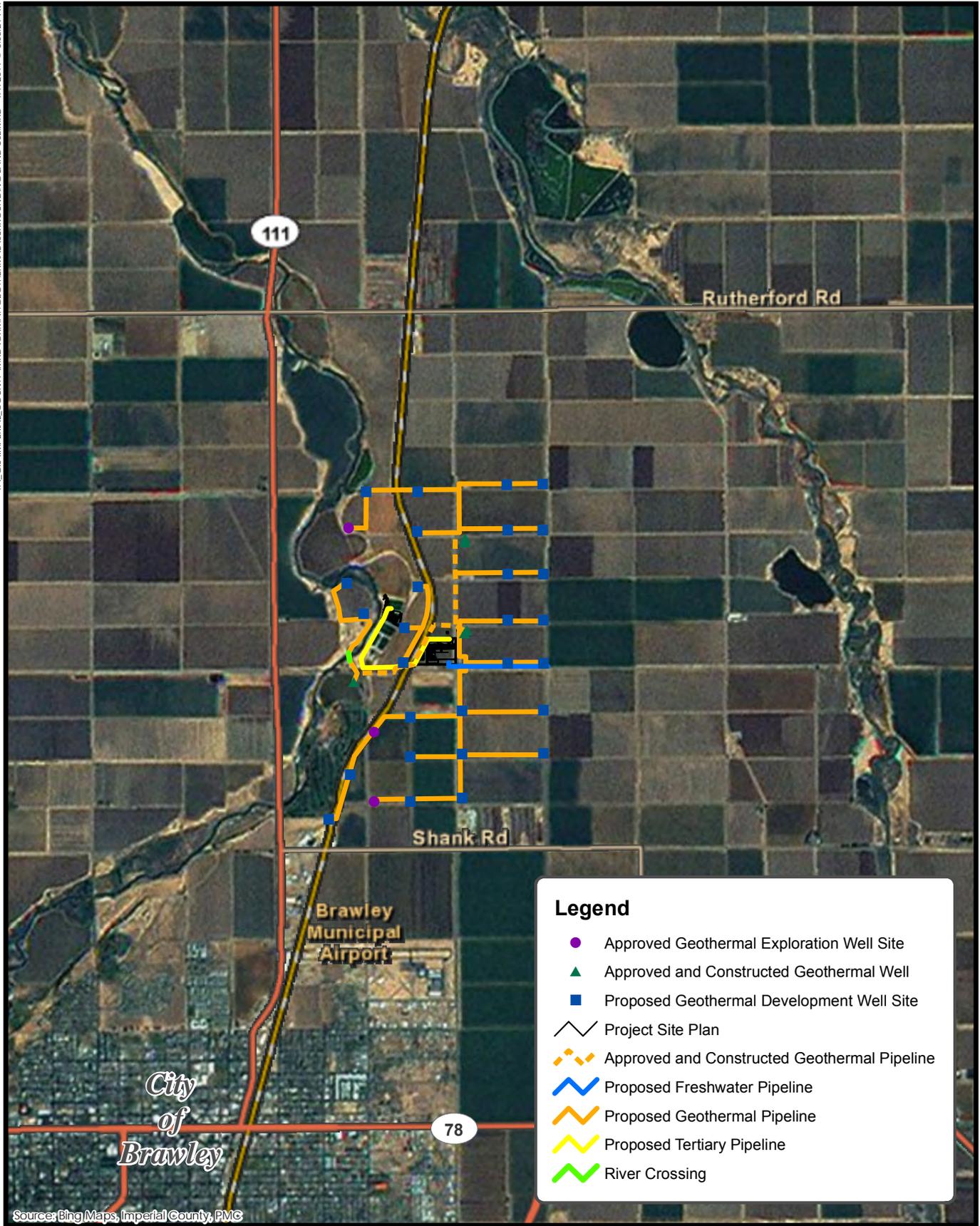
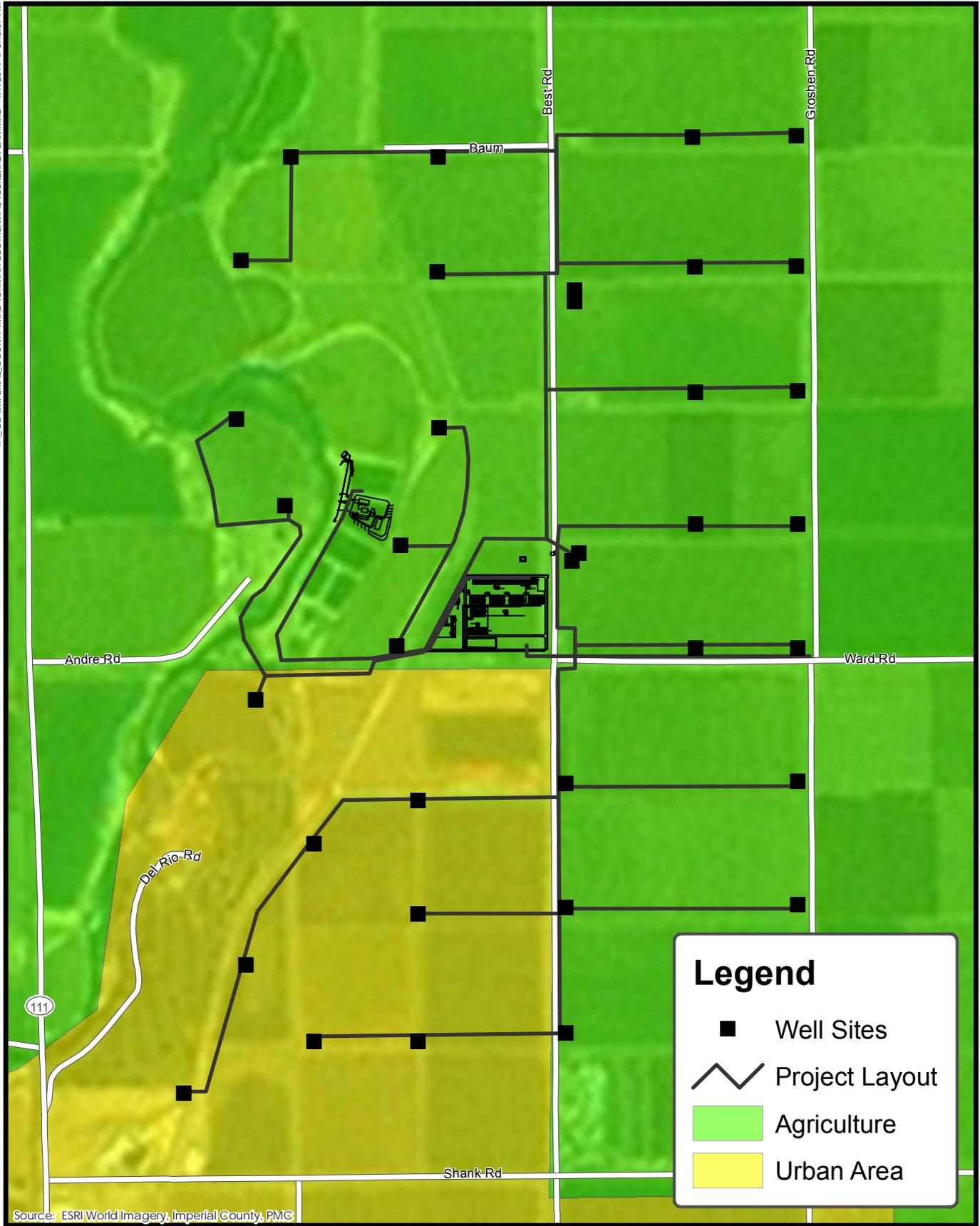


Figure 3.0-3
Surrounding Land Use



Source: ESRI World Imagery, Imperial County, PMC

Legend

- Well Sites
- Project Layout
- Agriculture
- Urban Area

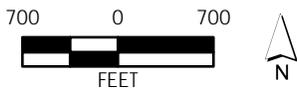


Figure 3.0-4
General Plan Land Use

3.2 PROJECT OBJECTIVES

The following objectives have been identified for the proposed project:

- Develop and operate a geothermal project.
- Assist with meeting federal, state, and local clean and renewable energy goals.
- Assist with state mandates under Assembly Bill 32 for greenhouse gases

3.3 LAND USE APPROVALS AND PERMITS

- Conditional Use Permits – To allow the construction of the proposed project as required under the zoning designation (CUP 08-0023 for power plant site and well pads)
- Air Quality Permit – Required to demonstrate compliance with all applicable Imperial County Air Pollution Control District (ICAPCD) rules and regulations
- Waste Discharge Requirements – Required for discharge of drilling mud and cuttings during drilling operations and for septic systems, as required by the Colorado River Basin California Regional Water Quality Control Board
- Grading and related permits from County Public Works Department, Engineering Division
- Building and related permits from County Building Division
- Drilling and operation of well permits from California Division of Oil, Gas and Geothermal Resources

3.4 PROJECT CHARACTERISTICS

The East Brawley Geothermal Development project includes the following project components:

- A 49.9 net megawatt (MW) geothermal power plant consisting of up to six Ormat Energy Converter (OEC) binary generating units (16 MW gross each) with vaporizers, turbines, generators, condensers, preheaters, pumps and piping, motive fluid (isopentane) storage, a motive fluid vapor recovery system, a gas scrubber, and a regenerative thermal oxidizer (RTO) and related ancillary equipment.
- Two cooling tower batteries with a total of 14–20 cell counter flow, induced draft with drift eliminators of 0.0005 efficiency.
- A control room, office maintenance shop, parking, and other facilities located at the power plant site.
- Approximately 36 total wells, approximately half for production and half for injection. The final number of wells will be determined by drilling results. Each well will average 4,500 feet in depth. Production wells will have a gas separator and corrosion and scale inhibitor and geothermal fluid booster pump to pump the fluid to the power plant. The production and injection wells may also have a sand separator. Six of these wells were already approved by the County under the East Brawley exploration permit (CUP 07-0029). Five wells were already drilled on three well pads.

3.0 PROJECT DESCRIPTION

- Piping from production wells to the power plant and from the power plant to the individual injection wells. Gas pipelines will take gas contained in the brine from the gas separators to either the injection wells or to the gas scrubber at the power plant.
- Blowdown wells (2–4) at the power plant site to provide for injection of the cooling tower blowdown.
- Pumps, tank, valves, controls, flow monitoring, and other necessary equipment to the wells and pipelines.
- Maintenance of the production and injection wells cited above.
- Piping, canals or ditches, and pumps to bring water from IID's Rockwood Canal to the power plant.
- A substation with a 2-mile-long double circuit 13.8 and 92 kilovolt (kV) transmission line with 66-foot-high poles to interconnect to the IID at the North Brawley 1 substation at Hovley and Andre roads. The transmission line will span the New River.
- Improvements to the existing BWWTP to include a tertiary treatment system in order to provide reclaimed water to the proposed power plant as well as the construction of a pipeline to convey the water from the BWWTP to the power plant (see the Utilities and Services section below for further detail).

Table 3.0-2 below summarizes the major components of the proposed East Brawley Geothermal Development project and their function and location.

**TABLE 3.0-2
EAST BRAWLEY GEOTHERMAL PROJECT FACILITIES SUMMARY**

Facility	Size	Location	Function
Well Pads	Up to 36 well pads (including the three existing exploration well pads) would be about 316 feet by 356 feet in size (~2 acres each). A mud sump/containment basin of about 75 feet x 260 feet x 7 feet deep would be located on each well pad.	Identified well pads from the exploration phase would be utilized to the extent feasible. Additional wells would be drilled as needed to provide adequate production fluid and injection capacity at well sites.	Well pads include all the equipment necessary to operate a well. During development, any additional drilling would occur from the well pads. Well pads also include containment basins for drilling and maintenance of the wells, as well as sand separation systems.
Production Wells	Inside diameter of the production wells would be approximately 30 inches at the top and would telescope with depth. Wells are expected to average about 4,500 feet deep.	Production wells would be located on the well pads at the well sites. Up to 18 production wells, each on a separate well pad, are projected.	Production wells flow geothermal fluid to the surface that is then transported via aboveground pipelines to the power plant to generate electricity.

3.0 PROJECT DESCRIPTION

Facility	Size	Location	Function
Injection Wells	Injection wells would be the same size as production wells.	Injection well locations have not yet been designated but would be among the well sites. Up to 3 injection wells could be located on each pad. Up to a total of 18 injection wells, each on a separate well pad, are projected.	Injection wells are used to inject spent geothermal fluid from the power plant back into the geothermal reservoir. Injection ensures the longevity and renewability of the geothermal resource.
Geothermal Production Fluid Pipeline	The pipeline system would vary in insulated diameter from 8 to 30 inches depending on individual well productivity. Up to about 9 miles of production pipeline could be constructed.	The piping system would connect the wells to the power plant. The production fluid pipeline would be located within the pipeline corridors.	Geothermal fluid would be transported from the production wells to the power plant via the geothermal production fluid pipeline.
Injection Fluid Pipeline	The injection piping system would vary in insulated diameter from 8 to 30 inches. Piping would extend from the power plant to the injection wells. Up to about 9 miles of injection pipeline could be constructed.	The injection pipeline would be located among the pipeline routes.	Cooled geothermal fluid would be transported from the power plant to the injection wells via the injection fluid pipeline where it would be injected into the geothermal injection reservoir.
Access Roads	Access roads would be no less than 10 feet wide.	Access roads would extend from existing County roads to the well pads. Existing farm roads would be used to the extent practical. Access roads developed for exploration would be used for any wells and pads that are used for development. Where new pads are created, new access roads would be developed.	Access roads are used during development to construct the production wells and install equipment. During utilization, access roads are used for accessing wells for maintenance.
OEC Units	Six 16-MW (gross) OEC units (manufactured by Ormat Turbines, Ltd.) comprising vaporizers, turbines, generators, condensers, preheaters, pumps, and piping.	The modular OEC units would be located on the power plant site.	The OEC units are the proprietary modular binary geothermal power generation equipment used on the power plant site.
Motive Fluid Pressure Vessels	The motive fluid would be stored in two 11,880-gallon pressure vessels.	The motive fluid pressure vessels would be located on the power plant site.	The motive fluid pressure vessels would be used to store isopentane for use in the OEC units.

3.0 PROJECT DESCRIPTION

Facility	Size	Location	Function
Vapor Recovery Unit	The vapor recovery unit consists of a diaphragm pump, a vacuum pump, and activated carbon canisters.	The vapor recovery unit is located on the power plant site.	The vapor recovery unit would provide a mechanism to minimize emissions of isopentane from the OEC units during maintenance.
Substation	The substation would occupy a site about 150 feet by 150 feet in size (about 0.5 acres).	The substation would be located adjacent to the power plant.	The substation converts power generated from the plant to the proposed line voltage, 92 kV.
Interconnection Transmission Line	There would be a new 2-mile-long double circuit 13.8- and 92-kilovolt (kV) interconnection transmission line with 66-foot-high poles.	The interconnection transmission line would connect to the IID grid at the North Brawley 1 substation at Hovley and Andre roads. The new line would span the New River. One proposed route and one alternative route are under consideration.	The interconnection transmission line would transfer the electricity generated by project to the existing power grid for distribution.
Noncondensable Gas Distribution Line	The noncondensable gas distribution line would range from 4 to 8 inches in diameter. Up to about 4.3 miles of pipe could be constructed.	Noncondensable gas distribution lines would run from well pad separators and power plant site separators to the injection wells.	Noncondensable gases from separators and other equipment would be compressed and injected into the subsurface reservoir.
Regenerative Thermal Oxidizer (RTO) and Caustic Scrubber	The top of the scrubber would be about 30 feet high.	The RTO/scrubber is located adjacent to the power plant.	The RTO/scrubber unit is best available control technology for the abatement of potential noncondensable gas (NCG) emissions
Cooling Towers	Two cooling tower units (each with seven to ten cells) would be used (manufactured by Cooling Tower Depot, Inc.). The cooling towers would be the largest and most prominent facility on the power plant site (about 54 feet in height).	The cooling towers would be located on the power plant site.	The cooling towers would provide cooling water to condense the motive fluid vapor in the condensers.

3.0 PROJECT DESCRIPTION

Facility	Size	Location	Function
Water Conveyance System	The water conveyance system would be a 10 – to 24-inch pipeline, about 1 mile in length, for water coming from the IID source. See text for alternatives to IID water. A 10- to 24-inch pipeline will be constructed to convey water from the BWWTP to the power plant.	Water intake from the IID Rockwood Canal Gate 131 would be either underground or put inside of the Livesley Drain that runs between the canal and the power plant site. See text for alternatives to IID water.	The water conveyance system would provide makeup water for the cooling tower at the power plant site.
Blowdown Wells	Two to four cooling water blowdown injection wells would be constructed similar to the geothermal injection wells.	The blowdown injection wells would be located adjacent to the power plant.	The dedicated blowdown wells are used to inject cooling water blowdown to reduce the concentration of dissolved solids in the cooling water.
Power Plant Site and Common Facilities	The power plant would occupy about 15 acres of the 33.7-acre parcel on which it would be located.	The power plant would be located on private land owned by Ormat Nevada Inc., aka ORNI 19, LLC.	The power plant site is the physical location where electricity would be generated using modular OEC binary geothermal power plant technology.
Control Room, Office and Maintenance Shop		Each of the facilities would be located on the power plant site.	These habitable structures would be used to control, manage, and maintain the project operations.

Source: Ormat 2010

PROJECT FACILITIES

Power Plant Site

The total area of the site where the geothermal power plant is proposed is approximately 33.7 acres, on APN No. 037-140-006. The property would be enclosed by a 6-foot wire fence. As discussed above, the main entrance to the power plant would be off Best Road just north of Ward Road from a left-hand turn pocket built for this project (see **Figure 3.0-5**).

The power plant consists of up to six Ormat Energy Converters (OECs) that each operate independently, but share common ancillary components such as isopentane storage, geothermal brine supply and injection, substation, etc. Geothermal fluids from production wells would flow through level 1 and level 2 vaporizers and preheaters of each OEC unit, transferring the heat to the isopentane motive fluid through the OEC's shell and tube heat exchangers. The cooled geothermal brine would then be sent to the geothermal brine injection system without coming into contact with the atmosphere, in a closed-loop system.

The vaporized isopentane working fluid from the level 1 and level 2 vaporizers would turn the level 1 and level 2 turbines, which together turn a common generator that produces electricity that is delivered to the substation where it is delivered to the transmission lines. The vaporized

3.0 PROJECT DESCRIPTION

isopentane is then condensed in a shell-and-tube condenser and returned to the preheaters and vaporizers to repeat the cycle. The use of isopentane is a closed-loop system.

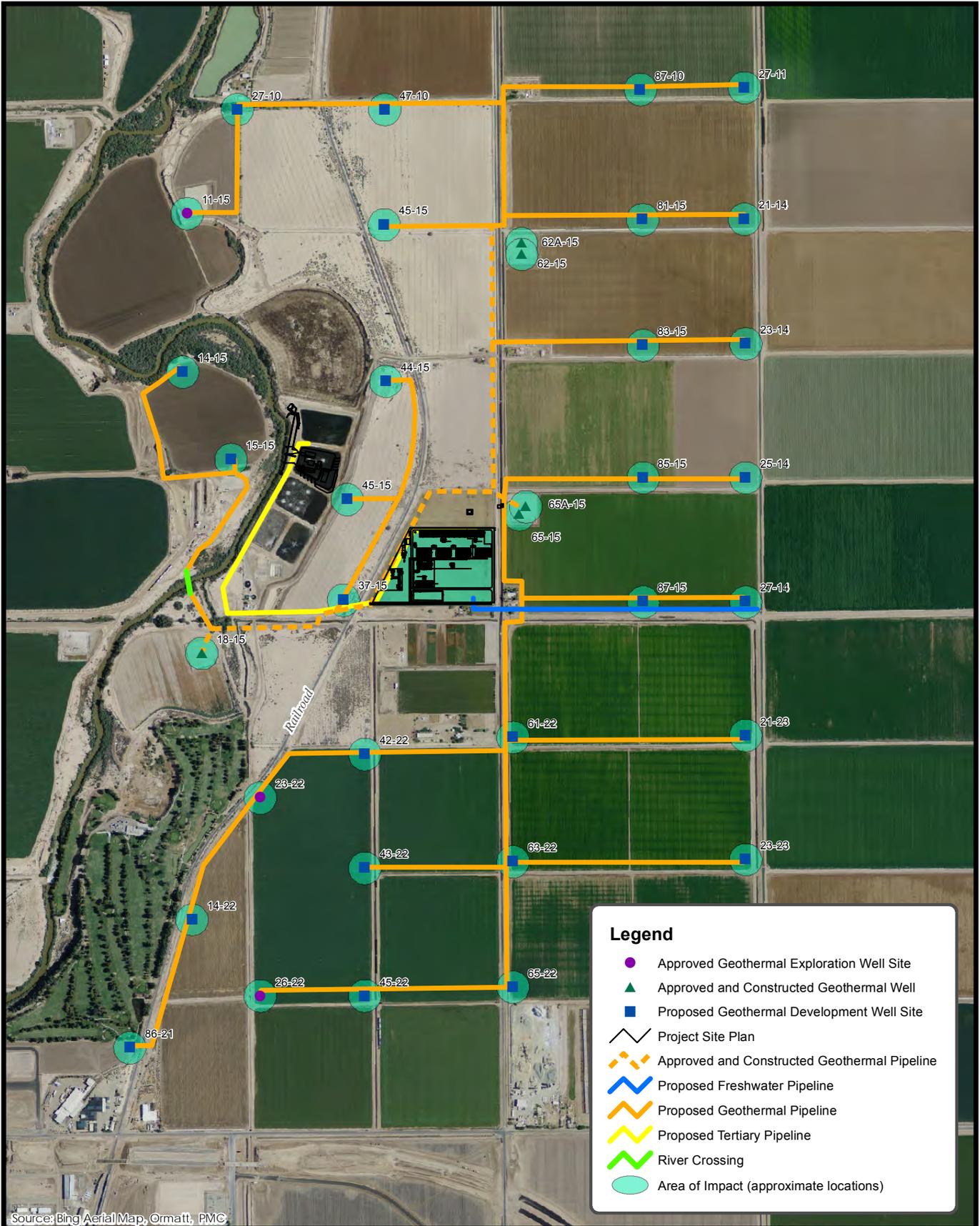
The isopentane vapor condensate is cooled by water circulating from the cooling tower. Water from the condensers is cooled in the cooling tower by evaporating the circulating water. Water from the cooling tower and the makeup water replace the evaporated water that would be obtained from the City of Brawley's WWTP (BWWTP) and under contract from the Imperial Irrigation District. Binary power plants such as this are closed-loop systems such that geothermal brine produced from the geothermal reservoir is injected in whole back into the geothermal reservoir. Therefore, a water supply is needed for the cooling system. This is different from a geothermal flash plant where the condensed geothermal steam is used for the cooling water. Flash plants are used on higher temperature geothermal resources than is the case with this resource.

A small portion of the circulating water would be injected into the geothermal reservoir via dedicated cooling tower blowdown wells adjacent to the plant site. The cooling tower blowdown removes the dissolved solids from the water that are concentrated as the water is cycled or reused in the cooling tower. The estimated amount of water required for this plant is 5,500 +/- acre-feet per year. The project proponent is working with the IID to supply this water as a temporary source. Although the Best Canal is closest to the power plant, IID has indicated it does not have the capacity to deliver the water from this canal due to changes in that canal south of the City of Brawley. Makeup water would be obtained from IID Gate 131 on the Rockwood Canal located about one-half mile east of the power plant site. The water from the Rockwood Canal would be gravity fed or pumped in a 10- to 24-inch pipeline that would be either underground or put within the Livesley Drain that runs east to west between the canal and the power plant (Ormat 2010). The project proponent is also working with the City of Brawley to assist in the upgrade of their wastewater treatment facility, which is currently treating effluent at a secondary treatment capacity. This upgrade would include tertiary treatment capacity to enable the project proponent to obtain 4,400 acre-feet of water from the treatment plant and 1,100 acre-feet from the Imperial Irrigation District.

Construction of the power plant would occur in one phase and would take approximately 15 months and require approximately 200 workers at peak construction.

Well Field

The well field would be located between Rutherford Road on the north, Dietrich Road on the east, the New River on the west, and just north of Shank Road on the south. Access to the well pads and pipelines would be from Best Road, Baum Road (not a county road), Groshen Road, Kerhsaw Road, Rutherford Road, Ward Road, and Willis Roads. Additionally, private farm roads and portions of IID rights-of-way for vehicular use may be used for access. Encroachment permits for ingress/egress and irrigation canal and drain crossings would be obtained from Imperial County Public Works and IID as applicable. Access to farmland would be coordinated with landowners to minimize impacts to farming operations. Well pads and pipelines would be along the edges of fields. New access roads would be constructed or improved only as needed to safely accommodate traffic required for well pad construction, well drilling, and maintenance of wells and roads. Road widths to well pads would typically be no less than 10 feet. The disturbed lands, except for possibly the power plant site, would be returned to agricultural use once the wells are abandoned. Specifically, the pipelines will be removed and the well pads reclaimed.



Source: Bing Aerial Map, Ormatt, PMC

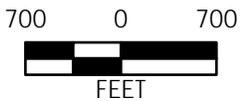


Figure 3.0-5
East Brawley Geothermal Project Site



Noncondensable Gas and Regenerative Thermal Oxidizer/Gas Scrubber

Noncondensable gases (NCGs) are naturally occurring gases in the geothermal fluid that are not easily condensed by cooling. They are predominantly (99.9 percent) made up of nitrogen, carbon dioxide, and methane. The NCGs separated from the geothermal production fluid would be compressed and injected back into the geothermal reservoir with the spent geothermal fluid. Under very high NCG content in the geothermal production fluid conditions, some of the NCG may be treated in a regenerative thermal oxidizer (RTO) and gas scrubber system to remove air pollutants from the NCG before venting the scrubbed NCG to the atmosphere (Ormat 2010, p. 10).

Each of the production wells would deliver geothermal fluid to the power plant through production pipelines. The geothermal fluids would first flow from the production wells through closed, high-pressure well pad separators that would separate most of the geothermal noncondensable gases from the geothermal brine. If the quantity of geothermal noncondensable gases in the geothermal fluid is less than the high end of the possible range, all of these separated geothermal noncondensable gases would flow through other dedicated pipelines to the power plant site, to be dissolved or entrained in the geothermal brine as it is injected into the geothermal fluid injection wells. Small quantities of these separated geothermal noncondensable gases would be discharged to the atmosphere along the dedicated pipelines as condensate, created as the gases cool, is drained from the pipeline (Ormat 2010, p. 10).

Cooling Water System

The cooling water system would consist of standard wet cooling tower technology with enhancements to reduce water consumption. Cooling water would be used to cool the motive fluid in the condensers and would cycle back to a cooling tower where the water would be cooled, stored, and made available for reuse as system process water. The isopentane vapor condensate is cooled by water circulating from the cooling tower through the condensers. Evaporative cooling in the cooling tower cools the circulating water. A small portion of the circulating water would be injected into the geothermal reservoir via dedicated cooling tower blowdown wells adjacent to the power plant site. The cooling tower blowdown removes the dissolved solids from the water that are concentrated as the water is cycled or reused in the cooling tower.

The cooling towers would circulate an average of approximately 195,000 gallons per minute (gpm) total of cooling water to the OEC units. An average of approximately 2,600 gpm of circulating cooling water would be evaporated from both cooling towers, and both would also blow down (discharge) an average of approximately 800 gpm. To maintain water balance, the cooling towers would require an average of approximately 3,400 gpm or 5,500 acre-feet per year (total) of cooling tower makeup water. Binary power plants such as the one proposed are closed-loop systems such that geothermal brine produced from the geothermal reservoir is injected in whole back into the geothermal reservoir. Therefore, only non-potable water supply is needed for the cooling system. This is different from a geothermal flash plant where the condensed geothermal steam is used for the cooling water. Flash plants are used on higher temperature geothermal resources than is the case with the East Brawley resource (Ormat 2010, p. 12).

Sodium hypochlorite (bleach) would be used for bacterial control in the towers as well as other chemicals for pH control and corrosion inhibition.

3.0 PROJECT DESCRIPTION

Geothermal Pipeline Systems

Each of the production wells would deliver geothermal fluid to the power plant through new production pipelines routed in corridors adjacent to existing farm roads or parallel to but outside of County road rights-of-way. The project proponent either has geothermal leases with the landowners where the pipelines would be located or would work with the landowners to obtain easements for the placement of the pipelines to minimize impact to farming operations and to stay outside of Imperial County rights-of-way, not only existing but for future expansion. The total length of the new production pipelines is dependent upon which of the wells are connected to the plant. If all 36 wells are connected, then approximately 9 miles of new pipeline would be constructed.

ACCESS AND CIRCULATION

The main entrance to the power plant would be off Best Road just north of Ward Road from a left-hand turn pocket built for this project. It would be necessary to cover Best Canal along the property frontage to accommodate widening of the road for the turn pocket. Emergency access would be from Best Road into the south end of the property on the north side of the Livesley Drain. The emergency access road would be constructed with an all-weather surface and lead to a locked gate that could be opened by any emergency responders. Both entrances into the plant site would provide access from the new SR 111 bypass that would include an exit onto Best Road just south of Shank Road. Traffic would come from Interstate 8, north of SR 111 to Best Road.

OPERATIONS AND EMPLOYMENT

Operation of the geothermal power plant would generate approximately 25 full-time employees. It is anticipated that daily employee trips will be 60 per day. These trips include the night shift and well field employees.

AESTHETICS

The proposed project is not visible from a scenic route designated in Imperial County's Circulation/Scenic Highway Element.

Lighting

Lighting would be installed throughout the site for security and nighttime use of the proposed facilities. Lighting would be projected downward to mitigate nighttime visibility of the facilities. Lighting would be directed downward and/or be on motion sensors and would not introduce any new source of substantial light or glare that would adversely affect day or nighttime views in the area.

Landscaping and Fencing

The property will be enclosed by a 6-foot wire fence. All of the power plant facilities will be painted an earth-tone color to blend into the background. There are currently no landscaping plans for the project.

Signage

There will be a small Ormat sign near the project entrance.

GRADING, DRAINAGE, AND WATER QUALITY

Grading

According to the geotechnical study prepared for the project, the site is level and minimal grading will be necessary. Grading concepts will consider that substantial thickness of structural fill will be required to separate structures from clay soils and that 6-foot-deep excavations are required for cooling water towers. Raising the plant grade above existing grade will reduce the amount of over-excavation needed (Black Eagle 2008, p. 4).

The applicant must submit a Grading and Drainage Plan/Study to the Imperial County Department of Public Works for property grading and drainage control. This submittal will also include prevention and sedimentation of damage to off-site properties and County roads. All grading, drainage, and retention basin designs must meet minimum standards in the latest County Guidelines Manual.

Drainage

A detailed drainage study will accompany the submittal of grading plans and address pre-development and post-development of the East Brawley geothermal power plant area. The drainage study will be based on an accurate topographic survey map and will be consistent with County of Imperial and UFC-3-210-10 design criteria.

Water Quality

Water quality will not be degraded as a result of site development. Design of the drainage and retention system will include measures to meet all county, state (Colorado Regional Water Quality Control Board), and federal (National Pollution Discharge Elimination System) water quality requirements.

Further discussion and details are provided in Section 4.8, Hydrology and Water Quality, of this Draft EIR.

UTILITIES AND SERVICES

Water Supply

Provision of water will be through a combination of suppliers and will involve three phases. Initially, the proposed project will be supplied its entire water demand of 5,500 acre-feet per year (AFY) by the Imperial irrigation District. Upon completion of proposed improvements to the BWWTP to include a tertiary treatment system (expected 2014), 4,400 AFY of reclaimed water will be supplied by the treatment facility and the remaining 1,100 AFY will continue to be supplied by IID.

As such, the proposed project includes expansion of the existing BWWTP to include a tertiary treatment system. The tertiary system would treat and divert water (approximately 1.4 million gallons per day) to the project site for use in the proposed geothermal plant. The proposed improvements to the BWWTP would generally include the installation of new treatment systems and equipment including pipelines, pumps, sedimentation tanks and basins, and filtering equipment. The upgrade will not increase the capacity of the existing BWWTP, and all improvements would occur within its existing footprint, which has been previously disturbed and developed.

3.0 PROJECT DESCRIPTION

Also as part of the proposed project, a pipeline will be constructed to convey water from the BWWTP to the power plant. The proposed location of this pipeline is shown on **Figure 3.0-5**.

It should be noted that the BWWTP is currently being upgraded to include a secondary treatment system as part of a separate project with completion expected in late 2011 or early 2012. This ongoing expansion project was addressed in a previous Mitigated Negative Declaration (MND) prepared by the City of Brawley (SCH No. 2008021134; the Notice of Determination was submitted to the State Clearinghouse on May 22, 2009). The proposed expansion of the plant to tertiary treatment was not addressed in this previous MND.

Water Demand

Further discussion and details pertaining to groundwater supply are provided in Section 4.8, Hydrology and Water Quality, and Section 4.13, Utilities. The project will require approximately 5,500 acre-feet of water per year that will be provided from the IID and the upgraded BWWTP.

Wastewater

Placement of any utilities within County road rights-of-way will require the applicant to secure an encroachment permit from the Imperial County Department of Public Works.

Energy

The project would generate approximately 49.9 net megawatts per year. Anticipated power demands for the project would not require improvements to the power utility's distribution system. The project will supply its internal demands.

Dry Utilities

No new distribution facilities or cabling is required to serve the project area. The project proponent would develop transmission lines from the project. The installation of all utilities would be coordinated with the County of Imperial and individual service providers. All utility lines would be placed in underground conduit. Further discussion and details regarding electricity/natural gas and telephone are provided in Section 4.13, Utilities, of this Draft EIR. Placement of any utilities within County road rights-of-way will require the applicant to secure an encroachment permit from the Imperial County Department of Public Works.

Solid Waste

Trash service for the proposed project would be available from private collection companies, such as Allied Waste Services, for disposal at local landfills. The Allied Landfill accepts Class III (municipal) waste at its facility located at 104 East Robinson Road in an unincorporated area east of the City of Imperial. Clean Harbors Environmental Services accepts Class I (hazardous) materials at its facility, located west of Westmorland at 5295 South Garvey Road, but it is not disposed of at this facility. Recycling facilities are limited to privately owned and operated drop-off centers.

Fire Protection/ Emergency Response

The City of Brawley Fire Department serves and would be the first responder to the proposed project site. The City maintains a staffed fire station at 815 Main Street.

The Emergency Medical Services (EMS) Agency incorporates ambulance companies, hospitals, fire departments, police departments, and other public and private providers into an integrated and coordinated system of services. Emergency medical response to the project area would be provided by private ambulance companies operating from Pioneers Memorial Hospital in Brawley or the El Centro Regional Medical Center, both of which provide full medical facilities, including 24-hour emergency room service.

As part of the conditions of approval, the applicant will prepare a Hazardous Materials Release Response Plan.

Law Enforcement

The Imperial County Sheriff's Department provides law enforcement services to the project site. It is anticipated that additional law enforcement would be required to maintain proper levels of service with implementation of the proposed project. The project applicant is proposing to provide private security from a trained, licensed, and bonded company to supplement the services offered by the Sheriff's Department.

Further discussion and details regarding fire and law enforcement services are provided in Section 4.11, Public Services, of this DEIR.

PROJECT PHASING

It is anticipated that the project would be fully implemented within a three-year time horizon.

CONSTRUCTION

The project is proposed to be constructed in occurring over 15 months. The durations of various construction activities are summarized in **Table 3.0-3** below.

**TABLE 3.0-3
CONSTRUCTION ACTIVITY DURATION**

Activity	Duration
Demolition	N/A
Grading	60 days
Underground Infrastructure	30 days
Paving	N/A
Building	360 days
Architectural Coating	N/A

Source: Project applicant

Grading operations would generate cut material only from roads, parking lots, and any other area proposed to be covered in asphalt. No mass grading is proposed for the site. Grading would occur over a total of approximately 22 acres of the site. The installation of underground infrastructure would occur over approximately 30 days. Paving activities would cover approximately 2 acres. A maximum of one paver, two rollers, and ten asphalt delivery trucks/trailers would be concurrently operational on any given day. Building construction would occur over a total of almost 15 months.

3.0 PROJECT DESCRIPTION

The project proposes to implement best management practices to reduce noise levels including the minimization of unnecessary construction vehicle use and idling time

3.5 REGULATORY REQUIREMENTS, PERMITS, AND APPROVALS

IMPERIAL COUNTY

Actions required to be taken by the Board of Supervisors, Planning Commission, and/or County staff may include, but are not limited to, the following approvals:

- Conditional Use Permit(s) for power plant operations and well field (CUP 08-0023) (CUP 07-0029 authorized six geothermal exploration wells in the East Brawley project area)
- Approval of a project Mitigation Monitoring and Reporting Program (MMRP)
- Approval of CEQA findings pursuant to State CEQA Guidelines Section 15091

Subsequent approvals may include, but are not limited to:

- Encroachment Permit
- Grading Permit
- Improvement Plans
- Building Permit(s)
- Occupancy Permit(s)

OTHER AGENCY APPROVALS

This DEIR may be used for the following direct and indirect actions regarding the proposed project:

California Department of Fish and Game (CDFG)

Under the California Endangered Species Act, incidental take permits for loss of California special-status species or their habitat may apply, if necessary.

Region 7 – Regional Water Quality Control Board (RWQCB)

The project applicant must submit a Notice of Intent to file for coverage under the Construction Activity and NPDES General Municipal stormwater permit issued through the State of California Water Resources Control Board. Approval of a stormwater pollution prevention plan (SWPPP) for construction phases only. Additionally, septic tank permits may be required.

City of Brawley

An agreement regarding provision of water to serve project needs.

Imperial County Air Pollution Control District

Approval and Issuance of an Authority to Construct permit and a Permit to Operate.

Imperial County Certified Unified Program Agency

Six state programs regulate business and industry's use, storage, handling, and disposal of hazardous materials and hazardous wastes were consolidated under Senate Bill 1082 in 1994 to be part of a single environmental control program managed by a Certified Unified Program Agency (CUPA) at the city or county level. Permitting for hazardous waste storage will occur through the Imperial County CUPA.

Imperial County Department of Public Health

Septic permits may be obtained through the Imperial County Department of Public Health

Local Agency Formation Commission (LAFCo) Actions

In accordance with Government Code 56133, a city or district may provide new or extended services by contract or agreement outside its jurisdictional boundaries only if it first requests and receives written approval from the commission in the affected county. Therefore, the proposed project will need to seek LAFCO review and approval.

3.0 PROJECT DESCRIPTION

REFERENCES

Black Eagle Consulting, Inc. 2008. *Geotechnical Investigation, East Brawley Geothermal Power Plant, Imperial County, California.*

Development Design & Engineering, Inc. (DDE). 2009. *Water Supply Assessment.*

Environ International Corporation. 2008. *Phase I Environmental Site Assessment, East Brawley Geothermal Development Project, Brawley, California.*

Ormat Nevada Inc. 2008. CUP application, CUP #08-0023. August 8.

———. 2010. Revised CUP application, CUP #08-0023. January 28.

4.0 INTRODUCTION TO THE ENVIRONMENTAL ANALYSIS AND ASSUMPTIONS USED

4.0 INTRODUCTION TO THE ENVIRONMENTAL ANALYSIS AND ASSUMPTIONS USED

The following is an introduction to the project-specific and cumulative environmental impacts analysis and general assumptions used in the analysis. The reader is referred to the individual technical sections of this Draft Environmental Impact Report (Draft EIR or DEIR) regarding specific assumptions and methodology and significance criteria used in the analysis.

ANALYSIS ASSUMPTIONS GENERALLY USED TO EVALUATE THE IMPACTS OF THE PROJECT

BASELINE ENVIRONMENTAL CONDITIONS ASSUMED IN THE DRAFT EIR

Section 15125(a) of the California Environmental Quality Act (CEQA) Guidelines requires that an EIR include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the Notice of Preparation (NOP) is published. The State CEQA Guidelines also specify that this description of the physical environmental conditions is to serve as the baseline physical conditions by which a lead agency determines whether impacts of a project are considered significant.

The environmental setting conditions of the project site and the surrounding area are described in detail in the technical sections of the DEIR (see Sections 4.1 through 4.14). In general, these setting discussions describe the setting conditions of the project site and the surrounding area as they existed when the NOP for the project was released in June 2010. In addition, the DEIR includes updated setting information since release of the NOP, such as the status of proposed and approved large-scale development projects in the region (see Approach to the Cumulative Impact Analysis subsection below).

GENERAL PLAN CONSISTENCY ANALYSIS

As required by CEQA Guidelines Section 15125(d), each technical section of the DEIR (Sections 4.1 through 4.14) has been evaluated for consistency with policies contained in the existing Imperial County General Plan (January 18, 1993, as amended through January 2008).

PROJECT CONSTRUCTION EFFECTS

The proposed project is a Conditional Use Permit for a geothermal power plant, a wastewater treatment facility upgrade, and associated well pads, located throughout the project area. Should the project be approved by the Imperial County Board of Supervisors, the project proposed for development has to be consistent with the General Plan and Land Use Ordinance policies and standards. The project would be subject to Imperial County and City of Brawley review and approval. It is at the time of development that construction impacts would occur. During the buildout of the project area and associated infrastructure improvements, typical construction impacts such as dust, equipment noise, water runoff, and increased or disrupted traffic are anticipated to occur. As a result, this DEIR includes mitigation measures to reduce these short-term, construction-phase impacts to a level of less than significant.

Construction-phase impacts that could be reduced to a level of less than significant through the implementation of mitigation measures were identified for aesthetics, air quality, biological resources, cultural resources, geology and soils, hydrology and water quality, land use and planning, noise, public services, and climate change. Project construction impacts specific to each area or environmental analysis are evaluated in the technical sections of the DEIR (Sections 4.1 through 4.14).

4.0 INTRODUCTION TO THE ENVIRONMENTAL ANALYSIS AND ASSUMPTIONS USED

PROJECT BUILDOUT ASSUMPTIONS

For the environmental analysis, it is assumed that buildout of the site would occur with development of the project as currently proposed. Two phases of development are proposed. Project operational impacts, such as traffic, air quality, noise, hydrology, and public services and utilities, are evaluated in the technical sections of the DEIR (Sections 4.1 through 4.14). **Table 4.0-1** includes the name, type of development, associated acreage, and status of other large-scale proposed and approved development projects in the area. The location of each project is also described in **Table 4.0-1** and shown in **Figure 4.0-1**. The cumulative setting also assumes existing projects. For the proposed project, it was determined that due to the distance of other potential cumulative projects, 12 near-term cumulative development projects are included in the analysis of the DEIR. The following is a brief description of these cumulative projects.

**TABLE 4.0-1
PROPOSED AND APPROVED PROJECTS WITHIN THE CUMULATIVE STUDY AREA
OF THE EAST BRAWLEY GEOTHERMAL DEVELOPMENT PROJECT**

#	Name of Project	Project Description	Status
1	Hudson Ranch II LLC (Burrtec)	This project consists of the development of a 49.9-MW geothermal energy facility on a 326-acre site in Niland.	Mitigated Negative Declaration in Process
2*	Salton Sea Solar Farm 11	This project consists of the development of a 100-MW solar energy facility on a 640-acre site in Calipatria.	Application Submitted
3	Chocolate Mountain Solar Farm	This project consists of the development of a 49.9-MW photovoltaic solar energy facility on a 320-acre site in Niland.	Environmental Impact Report in Process
4	Frink Road Solar Power	This project consists of the development of a 30.4-MW photovoltaic solar energy facility on a 280-acre site in Niland.	Mitigated Negative Declaration in Process
5	Black Rock Unit #1, 2, 3	This project consists of the development of a 159.0-MW geothermal energy facility on a 160-acre site in Niland.	Environmental Review in Process
6	Energy Source Solar 1, LLC	This project consists of the development of an 80-MW solar energy facility on a 480-acre site in Niland.	Pre-application Phase
7	IV Solar	This project consists of the development of a 709-MW solar energy facility on a 6,140-acre site in Octotillo.	Completed
8*	Salton Sea Solar Farm 1	This project consists of the development of a 49.9-MW solar energy facility on a 320-acre site in Calipatria.	Application Submitted
9	Superstition Solar 1	This project consists of the development of a 500-MW photovoltaic solar energy facility on a 5,516-acre site in Westmorland.	Joint Environmental Impact Report/Environmental Impact Statement in Process
10	Keystone Solar Power	This project consists of the development of a 6.1-MW photovoltaic solar energy facility on a 40-acre site in the Mesquite Specific Plan area.	Mitigated Negative Declaration in Process
11	Ormat 21, Wister Project	This project consists of the development of a 49.9-MW geothermal energy facility located north of Niland.	Application Submitted
12	Ram Power	This project consists of the development of a geothermal energy facility located near Orita.	Application Submitted
13	Casey Water Well	Proposal for a water well.	Pending

*Projects 2 and 8 are the same project located on two different parcels.

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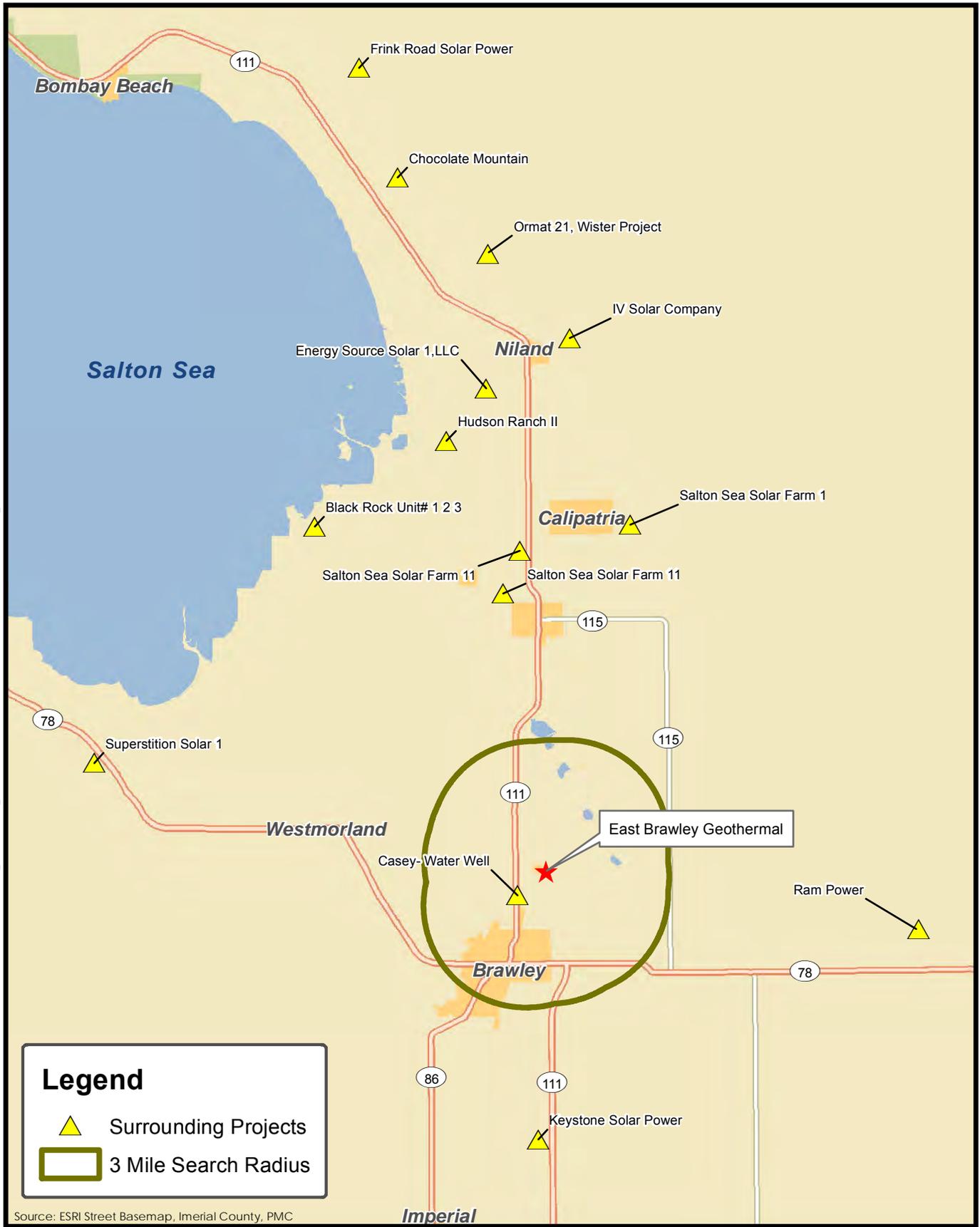


Figure 4.0-1
Cumulative Projects



STRUCTURE OF THE ENVIRONMENTAL IMPACT ANALYSIS

Sections 4.1 through 4.14 of this Draft EIR contain a detailed description of current setting conditions (including the applicable regulatory setting), an evaluation of the direct and indirect environmental effects resulting from the implementation of the proposed project, identification of proposed General Plan Update policies, action items, and code sections that mitigate the environmental effect, additional feasible mitigation measures, and identification of whether significant environmental effects of the project would remain after application of proposed policies and action items, and feasible mitigation measures. The individual technical sections of the Draft EIR include the following information.

Existing Setting

The subsection includes a description of the physical setting conditions associated with the technical area of discussion, consistent with State CEQA Guidelines Section 15125. As identified above, the existing setting is based on conditions as they existed when the NOP for the project was released in June 2010.

Regulatory Framework

This subsection consists of the identification of applicable federal, state, regional, and local plans, policies, laws, and regulations that apply to the technical area of discussion.

Impacts and Mitigation Measures

The Impacts and Mitigation Measures subsection identifies direct and indirect environmental effects associated with implementation of the proposed project and identifies ways to mitigate the environmental effects. Standards of significance are identified and used to determine whether identified environmental effects are considered significant and require the application of mitigation measures. Each environmental impact analysis is identified numerically (e.g., Impact 4.8.1 – Construction Impacts on Surface Water Quality) and is supported by substantial evidence included in the discussion. In addition to impacts created from the application of the standards of significance, the DEIR also addresses impacts to the provision of the proposed General Plan policies that could result in significant environmental effects.

Mitigation measures for the proposed project were developed through a thorough review of the environmental effects of the project site by consultants with technical expertise as well as by environmental professionals. The mitigation measures identified consist of performance standards that identify clear requirements that would avoid or minimize significant environmental effects (the use of performance standard mitigation is allowed under State CEQA Guidelines Section 15126.4(a) and is supported by case law *Sacramento Old City Association v. City Council of Sacramento* [3d. Dist 1991] 229 Cal.App.3d 1011, 1028 [280 Cal.Rptr. 478]).

APPROACH TO THE CUMULATIVE IMPACT ANALYSIS

Definition of Cumulative Setting

CEQA Guidelines Section 15130 requires that EIRs include an analysis of the cumulative impacts of a project when the project's effect is considered cumulatively considerable. In general, the cumulative setting conditions considered in this DEIR are based on the existing land use plans (General Plan and Land Use Ordinance) provided by Imperial County. The proposed project site contains approximately 3,066.9 acres on 40 parcels that are currently designated with a variety

4.0 INTRODUCTION TO THE ENVIRONMENTAL ANALYSIS AND ASSUMPTIONS USED

of agricultural and manufacturing Land Use Ordinance designations, as well as portions of the City of Brawley. The current General Plan land use for the site includes agricultural and urban land uses. Additional discussion regarding land use and zoning consistency is included in Section 3.0, Project Description, and Section 4.9, Land Use and Planning, of this DEIR.

Cumulative setting conditions also consider existing, proposed, approved, and reasonably foreseeable large-scale development projects. For the proposed project, it was determined that due to the distance of other potential cumulative projects, 12 near-term cumulative development projects are included in the analysis of the DEIR in the project vicinity, as listed in **Table 4.0-1**. This list of large-scale projects is intended to describe large-scale development activities in the vicinity of the project (cumulative study area) and is not intended to be an all-inclusive list of projects in the County of Imperial and City of Brawley.

The cumulative setting varies for each environmental issue area, depending upon the resources affected and any relevant boundaries. For example, some resources such as geology and soils have relatively site-specific impact potential, while other resource areas such as air quality are studied on a regional basis, covering the entire air basin within which a proposed project lies. Each technical section of the DEIR includes a description of the geographic extent of the applicable cumulative setting, based on the characteristics of the environmental issues under consideration as set forth in Section 15130(b) of the State CEQA Guidelines.

Consideration of Cumulative Impacts

Each technical section in the Draft EIR includes a description of the cumulative setting geographic extent based on the characteristics of the environmental issue under consideration (e.g., consideration of the Salton Sea Air Basin for cumulative air quality analysis) as set forth in Section 15130(b) of the State CEQA Guidelines. Each section also considers whether the project's contribution to anticipated significant environmental effects that would occur under cumulative setting conditions is cumulatively considerable (i.e., a significant effect).

"Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CEQA Guidelines Section 15065(a)(3)). Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time (CEQA Guidelines Section 15355(b)). The determination of whether the project's impact on cumulative conditions is considerable is based on a number of factors, including consideration of applicable public agency standards, consultation with public agencies, and expert opinion. Section 5.0, Cumulative Impacts Summary, provides a summary of the cumulative impacts associated with the proposed project. Cumulative impacts are based on the project's contribution to development compared with cumulative baseline conditions.

REFERENCES

County of Imperial. 1993. *Imperial County General Plan*. Imperial County, CA. January 18, 1993, as amended.

4.1 AESTHETICS

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) describes the existing visual resources of the proposed East Brawley Geothermal Development project (including the Brawley Wastewater Treatment Plant upgrade), summarizes the landscape characteristics of the surrounding area, and discusses the visual resources impacts associated with implementing the project (e.g., aesthetics, nighttime light, and daytime glare impacts). Visual impacts were evaluated using a combination of site reconnaissance, photo documentation, aerial photography, and the Imperial County General Plan. The analysis focuses on the impacts to views from existing roadways onto the project site, as well as overall changes to the visual landscape of the area.

4.1.1 EXISTING SETTING

EXISTING CONDITIONS

Regional Setting

Imperial County extends over 4,597 square miles between Riverside County, Mexico, San Diego County, and the State of Arizona and contains a wealth of scenic visual resources. These visual resources include desert areas, sand hills, mountains, and the Salton Sea (refer to **Figure 3.0-1**).

The desert areas of Imperial County include the Yuha Desert, the West Mesa area, which is bordered on the east by the Algodones Sand Dunes, lower Borrego Valley, East Mesa, and Pilot Knob Mesa.

Mountains make up another significant visual resource of Imperial County. On the west side of the county are the eastern foothills of the Peninsular Range. The Chocolate Mountains are located in the northeastern portion of the county, stretching northwest by southeast between Riverside County and the Colorado River. These mountains reach an elevation of 2,700 feet and are highly visible throughout the county. They are extremely rugged, virtually undeveloped, and used as a naval gunnery range (County of Imperial 1993).

Project Site

The proposed East Brawley Geothermal Development project is located in the unincorporated area of Imperial County, 1.5 miles north of the City of Brawley (see **Figure 3.0-1**). The power plant site is located east of State Route (SR) 111 and north of SR 78. The Del Rio Country Club is south of the project site. The eastern boundary of the project is Dietrich Road, and Rutherford Road is to the north. A majority of the project site is located along Best Road from Shank to Rutherford roads.

The East Brawley Geothermal Development project is relatively level at an elevation of about 142 feet below mean sea level (msl). The regional ground surface slopes toward the northeast at 12 feet per mile, or a 0.2 percent gradient. The project is bounded on the west by the New River, which is also the nearest surface water body. The project area is characterized by agricultural fields with a few rural houses and farm-related structures.

The proposed project is not located within a designated or eligible state scenic highway or route according to the California Department of Transportation (Caltrans) California Scenic Highway Mapping System (Caltrans 2009) or the Imperial County Circulation and Scenic Highways Element (Imperial County 2008).

4.1 AESTHETICS

The proposed project site contains scattered agricultural buildings and residential structures, as well as existing geothermal drilling sites. **Photo 1** through **Photo 4** provide views of the project site.



Northeast of project site looking southwest



Northwest of project site looking south



Southeast of project site looking north



South of project site looking northwest

Adjacent Areas

Due west of the project site is the Brawley Wastewater Treatment Plant (BWWTP). South of the project site is actively cultivated farmland. The New River runs west of the project site, beyond the agricultural land. The Del Rio Country Club and the City of Brawley are southwest of the project area. The North Brawley Geothermal Project is located west of the project site, across the New River. Large storage silos are on the north end of the project area, and a feedlot is south of the project area on Shank Road. An existing Imperial Irrigation District distribution transmission line exists along Best Road adjacent to the power plant site. The power plant site is adjacent to a City of Brawley designated urban area boundary. Multiple commercial and industrial facilities, including the Brawley airport, are visible from the project site.



Northeast corner of BWWTP looking southwest



South end of the BWWTP looking north

4.1.2 REGULATORY SETTING**FEDERAL AND STATE****California Scenic Highway Program**

The State Legislature created the California Scenic Highway Program in 1963. Its purpose is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been so designated. Cities and counties can nominate eligible scenic highways for official designation by identifying and defining the scenic corridor of the highway. The municipality must also adopt ordinances to preserve the scenic quality of the corridor or document such regulations that already exist in various portions of local codes.

A segment of Interstate 8 proposed for Scenic Highway Designation status lies between the San Diego county line and the interstate's junction with State Route 98 (Caltrans 2009). This segment, known as Mountain Springs Grade, has a long, rapid elevation change, remarkable rock and boulder scenery, and plant life variations (County of Imperial 2008). The proposed project is not located within this area. A segment of State Route 78 proposed for future Scenic Highway Designation status is the closest to the proposed project site. It is located west of the Salton Sea and is not located near the project site. Thus, the project site is not in the viewshed from this stretch of State Route 78.

4.1 AESTHETICS

LOCAL

County of Imperial General Plan

The Imperial County General Plan serves as the overall guiding policy for the County. Although the Open Space and Conservation Element and the Land Use Element of the General Plan include goals and objectives for preservation of visual resources, no policies within these elements have been established that are relevant to the proposed project.

The only relevant Imperial County General Plan policy related to aesthetics is Policy 9(b) in the Circulation and Scenic Highways Element as presented in **Table 4.1-1**.

**TABLE 4.1-1
PROJECT CONSISTENCY WITH GENERAL PLAN VISUAL RESOURCE POLICIES**

General Plan Policies	Consistency with General Plan	Analysis
9. Scenic Highway Program/Landscaping b. The County shall emphasize protection of scenic highway resources in all County actions affecting land use.	Yes	The proposed project is not located in the viewshed of any scenic highway resources.

While this DEIR analyzes the project's consistency with the General Plan pursuant to State CEQA Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

4.1.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

Based on the criteria derived from Appendix G of the CEQA Guidelines, the proposed project would result in a significant impact to aesthetic resources if the project would:

- 1) Have a substantial adverse effect on a scenic vista.
- 2) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings, within a state scenic highway.
- 3) Substantially degrade the existing visual character or quality of the site and its surroundings.
- 4) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.

METHODOLOGY

Analysis of impacts to visual character is subjective by nature, because the qualities that create an aesthetically pleasing setting will vary from person to person. For the purposes of this analysis, the site and its vicinity have been visited in order to consider the existing community character and to determine the proposed project's consistency with the surrounding area and with

applicable Imperial County General Plan goals or policies. Site photographs presented in this section depict the existing visual character of the project site and contributed to the visual analysis of the project. Therefore, the site photos assist in the analysis to determine if the project significantly alters a scenic view or vista or resources that were not characteristic of the project area.

A segment of State Route 78 proposed for future Scenic Highway Designation status is the closest to the proposed project site. It is located west of the Salton Sea and is not located near the project site. Thus, the project site is not in the viewshed from this stretch of State Route 78. Therefore, there would be no impact related to aesthetic resources within the viewshed of a Designated Scenic Highway. This issue will not be further addressed in the DEIR.

PROJECT IMPACTS AND MITIGATION MEASURES

Substantial Adverse Effect on a Scenic Vista

Impact 4.1.1 Implementation of the proposed project is not anticipated to result in the alteration of a scenic vista. Therefore, this impact is considered **less than significant**.

Implementation of the East Brawley Geothermal Development project would result in the development of 15 acres of the 33.7-acre parcel for the development of a geothermal plant. A total of 188.75 acres (including the geothermal plant and proposed wells and pipelines) would be disturbed to accommodate the project. In addition, improvements would be completed at the BWWTP, and a pipeline would be constructed to convey water from the BWWTP to the power plant.

The County General Plan does not provide a definition for a scenic vista. Therefore, for the purposes of this Draft EIR, a scenic vista can be described as scenic features that are listed, designated, or otherwise recognized by the County. In the absence of such formal recognition of value, there may be other indications that a view is valued for being a scenic vista. For example, a high-quality viewshed from a recreational site or tourist destination may be presumed to be "valued" as a scenic vista.

Currently, the project site is characterized by agricultural fields with a few rural houses and farm-related structures as shown in Photos 1 through 4, above. There are no scenic vistas within the viewshed of the various aspects of the proposed project, given the flat nature of the site. Neither are there any designated state or local scenic highways within the vicinity of the project site. According to the Conditional Use Permit application package, the proposed power plant would be visible from the existing State Route (SR) 111 west of the power plant site and the Brawley SR 78/111 bypass south of the project site (under construction) at distances ranging from 1 to 2 miles. Though these proposed structures would alter the visual character of the undeveloped property, the project would be subject to conditions of approval by the County of Imperial Planning and Development Services Department concerning height limits to buildings and associated structures. Additionally, since there are no designated scenic highways or vistas to or from the project site, impacts relating to scenic vistas are considered **less than significant**.

Mitigation Measures

None required.

4.1 AESTHETICS

Degradation of the Existing Visual Character

Impact 4.1.2 Implementation of the proposed project would change the existing visual character of the project site and its surroundings. This is considered a **less than significant** impact.

Implementation of the proposed project would result in alterations to the existing landscape of the site. The current character of the site would change from agricultural to a geothermal power plant and associated wells and pipelines. The tallest allowable proposed structures would be the drilling rigs. During drilling, the top of the drill rig derrick would be as much as 175 feet above the ground surface, and the rig floor could be 20 to 30 feet above the ground surface (Ormat 2010, p. 22). The drilling rigs would temporarily change the existing quality and character of the project area by introducing tall structures to the area during drilling. However, because it is temporary and short term, the drill rig structure would not permanently change the existing visual quality and character of the project area.

The proposed project site would be located in a rural community. As previously described, the project area contains scattered agricultural buildings and residential structures, as well as existing geothermal drilling sites.

Following the completion of drilling and flow testing, there would be gas separator on each production well pad. The gas separators would be about 6 feet in diameter, 20 feet long and 18 feet tall. They would be painted an earth-tone color to blend into the background. They would be similar to equipment found around the fields such as pump stations (Ormat 2010, p. 24).

There would be no visible emissions from the well pads once the wells are in production. The wellhead pumps would extend 8 to 10 feet above the wellhead. There may be an aerial distribution power line to the production well pads to run the production pumps if the power is not run in a conduit along a pipeline.

During power plant operations, cooling towers, the tallest facilities on the power plant site, would be about 54 feet in height (Ormat 2010, p. 5). Visible condensate plumes from the cooling towers could extend up to several hundred feet above the tower structures. These plumes would exist whenever atmospheric conditions would allow condensate to appear, but would be expected to be most visible on cool mornings depending on the humidity and ambient temperature. The condensate plumes would be similar to those of multiple other geothermal power plants near the Salton Sea. The power plant facilities, condensate plumes, 66-foot-tall power poles, and interconnection transmission line would add industrial aspects to the already visually impacted character of the quasi-rural site and its surroundings, but these facilities would result in minor alteration to the existing visual character of the area, which includes similar existing operations (Ormat 2010, p. 5). Visual depictions of the North Brawley operations are included below.



North Brawley north cooling tower



North Brawley production well



North Brawley injection well

Planned development of power plant building for all structures would be subject to review for consistency with the County of Imperial General Plan Geothermal-Transmission Element, as well as with all other applicable regulatory requirements, during plan review and building permit processes through the County of Imperial Planning and Development Services Department. Where the proposed project deviates from the Geothermal-Transmission Element land use standards, the project will be required to obtain a conditional use permit from Imperial County.

In accordance with Imperial County General Plan Conservation Element policies on erosion control, upon completion of project construction activities, graded areas (excluding well pad areas) would be planted with grass and small-plant landscaping. This landscaping would enhance the views from the roadway by introducing greenery to an existing otherwise vacant parcel. The proposed project would also adhere to landscaping standards for industrial uses, according to Section 90302.02 of Imperial County's Land Use Ordinance (Title 9; Division 3; Chapter 2). Although the proposed project would be a new visual feature that is dissimilar to other buildings located in the project area, the project is located within the Imperial County Geothermal-Transmission Element area, where development of geothermal power plants and associated wells and pipelines is expected.

In addition, the proposed improvements at the BWTP would occur within the existing footprint of the plant and would be consistent with the existing visual character of that site. Further, the

4.1 AESTHETICS

proposed pipeline from the BWWTP to the power plant would be constructed underground and would have no permanent effect on the visual character of the area. Therefore, impacts relating the existing visual character of surrounding land uses would be **less than significant**.

Mitigation Measures

None required.

Creation of Substantial Light and Glare

Impact 4.1.3 Development of the proposed project would introduce new sources of light and glare, resulting in an increase in ambient light and glare levels. This is a **less than significant** impact with mitigation incorporated.

Implementation of the proposed East Brawley Geothermal Development project would introduce new sources of daytime glare to a site that is currently agricultural lands. Development of the site would introduce industrial structures, including a power plant, pipelines, wells, and temporary drilling rigs, to the site. Some of these structures may have reflective materials such as glass windows, metal roofs, or other metal treatments that could create glare. In addition, automobile windshields associated with project vehicular traffic can also create glare on the project site.

Site construction activities would be conducted during the day and would not introduce any sources of nighttime light, except during the summer when it is safer to work at night due to extreme daytime temperatures. Drilling and flow-testing activities would be conducted 24 hours per day. Nighttime light sources during drilling and flow testing would be confined to the drill rigs and other operational areas as necessary for safety. There will be minimal vehicular traffic on the project site during nighttime hours; therefore, nighttime glare of lights from automobile and truck headlights would be rare. The lighting used for the drill site during drilling and flow testing will be focused downward and would not be directly visible at substantial distances. Therefore, no new sources of substantial light or glare would adversely affect the area. Similarly, power plant operations would occur 24 hours per day, seven days a week. Lighting would be directed downward and/or be on motion sensors and would not introduce any new source of substantial light or glare in the area. This is a less than significant impact with mitigation incorporated.

Mitigation Measures

MM 4.1.3 All construction-related lighting shall include shielding in order to direct lighting down and away from adjacent areas and consist of the minimal wattage necessary to provide safety at the construction site. The exterior finish of building materials shall be painted an earth-tone color to blend into the background. Exterior finishes shall be limited to non-reflective materials such as concrete, masonry, or stucco, though metal or synthetic wall panels with similar appearance to the aforementioned materials may also be acceptable as determined by the Planning and Development Services Department.

Timing/Implementation: Prior to the issuance of occupancy permits

Enforcement/Monitoring: Imperial County Planning and Development Services Department

Significance after Mitigation

Upon implementation of mitigation measure **MM 4.1.3**, impacts to light and glare would be **less than significant**.

4.1.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for visual resources/light and glare is the proposed, approved, and conceptual development anticipated in the Geothermal-Transmission Element area, approved by the County of Imperial, which calls out general and specific standards. Standards include preserving farm operations by minimizing surface land usage for geothermal exploration and facilities and by avoiding disruption to existing irrigation and drainage patterns; maintaining adequate setbacks from property lines, streets, and in particular, noise-sensitive land uses such as residences, schools, and hospitals; avoiding nuisance and unsightly conditions with appropriate limits on hours of operations, light control, and adequate fencing and landscaping; and establishing proper procedures for system shutdown and site abandonment. It is unlikely that development not already approved or anticipated by the General Plan would occur that would result in adverse aesthetic impacts, as the Geothermal Overlay Zone area was specifically created for such uses. Additionally, due to the lack of scenic highways, viewsheds, or other scenic resources in the area, a less than cumulatively considerable impact would occur.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Aesthetics

Impact 4.1.4 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would alter the visual character of the area resulting in a change to public views as well as increased nighttime light and daytime glare levels. This is considered to be a **less than cumulatively considerable** impact.

Future development in the Geothermal-Transmission Element area would result in future alteration of the existing landscape. Project-related increases in light and glare in the area could potentially result in adverse cumulative impacts in combination with other proposed projects. The proposed East Brawley Geothermal Development project's location is within the Geothermal Overlay Zone area designated for the development of geothermal exploration uses and surrounded by active agricultural land. It is unlikely that additional considerable increased development would occur that would result in adverse aesthetic impacts not already addressed in the General Plan, because the proposed project is located in an agriculturally designated area, with minimal urban development. Additionally, there are no sensitive viewers in the vicinity of the project site and existing views are of low visual quality. The proposed development would be compatible with existing and projected land uses in the surrounding area; therefore, visual impacts would be **less than cumulatively considerable**.

Mitigation Measures

None required.

4.1 AESTHETICS

REFERENCES

California Department of Transportation (Caltrans). 2009. *California Scenic Highway Mapping System*. http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm (accessed August 2010).

County of Imperial. 1993. *Imperial County General Plan Conservation and Open Space Element*. El Centro, CA.

———. 2008. *Imperial County General Plan Circulation and Scenic Highways Element*. El Centro, CA.

Ormat Nevada Inc. 2010. Revised CUP application, CUP #08-0023. January 28.

4.2 AGRICULTURAL RESOURCES

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) describes the existing agricultural resources of the proposed project site and surrounding area. The section also discusses the project in the context of Imperial County's General Plan Agricultural Element, adopted in 1993 and amended in 1996. The analysis focuses on impacts to agricultural resources associated with the development and operation of the proposed East Brawley Geothermal Development project, including potential conflicts with agricultural uses and consistency with policies pertaining to agricultural resources.

4.2.1 EXISTING SETTING

REGIONAL SETTING

Imperial County covers an area of 4,597 square miles or 2,942,080 acres. Approximately 20 percent of the land is irrigated for agricultural purposes, most notably the central area known as Imperial Valley. Two other major irrigated areas are Bard Valley in the southeast corner of the county and Palo Verde Valley in the northeast corner (County of Imperial 1996).

Favorable climate, productive soils, and the availability of irrigation water have permitted Imperial County to become a leading producer of agricultural products. Irrigation agriculture in the county is extremely diverse and includes numerous types of vegetable crops, including lettuce, carrots, onions, tomatoes, cauliflower, and broccoli; alfalfa, Sudan grass, and other animal feed; sugar beets; wheat and other grains; melons; cotton; and various citrus, fruits, and nuts. In 1990, Imperial County surpassed one billion dollars in gross income from all agricultural products combined, and in 1988, 1989, and 1991, the gross income was a little under the one billion dollar figure. Vegetable and melon crops, as a category, have traditionally represented the highest gross value, followed by field crops, fruit and nut crops, seed crops and nursery products, and apiary products. Detailed descriptions of crop production values and acreages cultivated are provided annually in the Imperial County Agricultural Crop & Livestock Report by the Agricultural Commissioner (County of Imperial 2009).

Two resources that are vital to past and future agricultural production are productive soils and adequate water.

Water Resources

Water for irrigation in Imperial County is diverted from the Colorado River at the Palo Verde Diversion Dam north of Blythe by the Palo Verde Irrigation District and at Imperial Dam through the All-American Canal headworks and desilting basins by the Imperial Irrigation District (IID) and the Bard Irrigation District for use in the Yuma, Bard, Imperial, and Coachella valleys. In the Imperial Valley, approximately 2.9 million acre-feet of water is delivered annually to over 500,000 acres of agricultural lands via an elaborate gravity-flow system of about 5,600 water delivery points, 1,675 miles of canals and laterals (more than 1,000 miles of which are concrete-lined), and 6 regulatory reservoirs. IID also maintains a 1,457-mile drainage system, which collects surface runoff and subsurface drainage from 32,222 miles of tile drains (County of Imperial 1996).

Irrigation is critical for crop production in Imperial County. Most basically, irrigation permits farmers to apply measured amounts of water to particular crops as required. The water delivery system is sophisticated enough that next-day water orders can normally be accommodated when necessary. Although some crops are affected by salinity, extreme temperatures, and other environmental factors, the existing water delivery system overcomes the lack of precipitation as a significant limiting factor to intensive crop production in this otherwise arid region (County of Imperial 1996).

4.2 AGRICULTURAL RESOURCES

Livestock Production

Livestock production, or animal husbandry, represents the second major form of agricultural production in Imperial County. Livestock production focuses on the production of beef cattle, sheep, wool, dairy products, swine, and, more recently, fish and other aquatic products. Horses are also used for work and pleasure. Imperial County offers many advantages to livestock producers. Locally grown crops provide a variety of feed ingredients for beef cattle, dairy cattle, sheep, and other animals, and adequate supplies of clean, fresh water are available from the water delivery systems described above. Although hot in the summer, the climate is dry and mild in winter, making feeding conditions ideal for cattle and sheep (County of Imperial 1996).

Per the 1996 General Plan Agricultural Element, the annual gross income from livestock production in the county ranged between 177 and 264 million dollars from 1977 to 1991, thereby typically representing 20 to 25 percent of the total agricultural gross income. According to the 2007 Agricultural Crop & Livestock Report, the annual gross income from livestock production was over 410 million dollars, which represented approximately 30 percent of the total agricultural and livestock gross income. In the general category of livestock production, beef cattle represent the single most important product to date. Taking into account all agricultural products, cattle has long been the highest ranked million-dollar product, surpassed only in 1988 by lettuce as the top performer (County of Imperial 1996, 2008).

Cattle production represents a major role in the county's economy by providing income, tax revenue, employment, and the purchase of local goods and services. Feed yards use many crops grown by Imperial County farmers including alfalfa, bermuda hay, bermuda straw, oat hay, Sudan grass hay, rye grass hay, and wheat straw (County of Imperial 1996).

It is noteworthy that alfalfa has typically been the second highest million-dollar product in Imperial County; a considerable portion of this field crop is consumed by locally raised livestock. Winter grazing of these crops in recently harvested fields is also important to cattle production and farmers alike, as are sugar beet tops, which are grazed by cattle from April to July. Several crop culls including melons and carrots are also fed to cattle, and locally produced beet pulp and molasses are used in feed yards; lower-quality roughages that do not meet nutrient requirements for dairy cattle or retail markets are suitable for use in feed-yard rations. In addition, wheat and other locally grown grains are sold to cattle feeders when export or domestic markets are unfavorable, giving the farmers an alternative market for these crops (County of Imperial 1996).

Dairy cattle also represent a significant agricultural product in Imperial County, although the number of dairies has declined recently. Sheep are an important commodity, particularly in the winter when other regions throughout the West are unsuitably cold. The value of sheep was 7.3 million dollars in both 1985 and 1991, although it decreased to a low of 4.7 million dollars in 1986 (County of Imperial 1996). The value of sheep rebounded to over 9 million dollars in 2006, then fell to approximately 8 million dollars in 2007 (County of Imperial 2008).

Aquaculture, which involves the controlled growing of phytoplankton, zooplankton, and aquatic invertebrates, as well as "higher" aquatic plants and animals in marine, brackish, or fresh water, has increased rapidly over the past decade as a significant form of agriculture in Imperial County. Aquaculture products include fish, especially, and also fiber, pharmaceuticals, and chemicals. Aquaculture uses a variety of systems including ponds, raceways, silos, circular tanks, cages, and recirculating systems to grow fish, plants, and animals (County of Imperial 1996).

The aquaculture industry is attracted to Imperial County because of the long growing season made possible by bright sunshine and cloudless days and by the abundant water supply offered by the Colorado River. Also available are heavy clay soils for pond construction, compatible uses of adjoining lands, relatively low-cost flat land, relatively low-cost electricity, and direct heat use of the county's geothermal resources. The proximity of this area to Los Angeles County, Orange County, and San Diego County markets is an additional advantage to locating in Imperial County. Although not currently exploited, two other important resources may, in the future, prove attractive for aquaculturalists: water from the Salton Sea (although this may be limited due to the current high levels of salts and toxic elements) and carbon dioxide trapped in groundwater (County of Imperial 1996).

Aquatic products in Imperial County had a gross annual value of 8.6 million dollars in 1991, representing a steady increase in gross income from 2.6 million dollars in 1985. According to a report published by the Economic Research Service of the U.S. Department of Agriculture (USDA), aquaculture is the fastest growing segment of the overall agriculture industry. High population areas in Southern California, Baja California, and Arizona give livestock producers in Imperial County a market unmatched in other areas in the country, and rail access to the Port of Los Angeles provides convenient access to international markets (County of Imperial 1996). In 2007, aquatic products in Imperial County had a gross annual value of 10.9 million dollars (County of Imperial 2008).

FARMLAND CLASSIFICATIONS

The two systems used by the United States Department of Agriculture, Natural Resource Conservation Service (NRCS) to determine a soil's agricultural productivity include the Soil Capability Classification System and the Storie Index Rating System. The prime soil classifications of both systems indicate the absence of soil limitations which, if present, would require the application of management techniques (e.g., drainage, leveling, special fertilizing practices) to enhance production.

Soil Capability Classification

The Soil Capability Classification System takes into consideration soil limitations, the risk of damage when the soils are used, and the way in which soils respond to treatment. Capability classes range from Class I soils, which have few limitations for agriculture, to Class VIII soils, which are unsuitable for agriculture. Generally, as the ratings of the capability classification system increase, the yields and profits are more difficult to obtain. A general description of soil classification, as defined by the NRCS, is provided in **Table 4.2-1**.

**TABLE 4.2-1
SOIL CLASSIFICATIONS**

Class	Definition
I	Soils have few limitations that restrict their use.
II	Soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
III	Soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.
IV	Soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

4.2 AGRICULTURAL RESOURCES

Class	Definition
V	Soils are not likely to erode but have other limitations, impractical to remove, that limit their use.
VI	Soils have severe limitations that make them generally unsuitable for cultivation.
VII	Soils have very severe limitations that make them unsuitable for cultivation.
VIII	Soils and landforms have limitations that nearly preclude their use for commercial crop production.

Source: USDA-NRCS 2010

For the purposes of identifying agricultural resources in Imperial County, the Soil Capability Classification System definition of prime agricultural soils states prime agricultural soils are those that have the best combination of physical and chemical characteristics for producing agricultural crops. This definition continues to be applicable to Class I, II, and III soils. A significant portion of Imperial County is therefore highly suited for agricultural production if adequate quantities of irrigation water are available.

Class II soils are scattered in the northwest, west, and southeast portions of the irrigated area of the San Felipe Creek areas, in the vicinity of the Salton Sea Test Base, and in the Bard area of Imperial County. While some of these Class II soils are presently not irrigated, they warrant preservation as prime soils. An extensive area of non-irrigated Class III soils is located east of the East Highline Canal in the county. Barring the availability of substantial amounts of irrigation water from a new source, noticeable expansion of irrigated acreage appears unlikely (County of Imperial 1996).

Storie Index Rating System

The Storie Index Rating System ranks soil characteristics according to their suitability for agriculture from Grade 1 soils (80 to 100 rating), which have few or no limitations for agricultural production, to Grade 6 soils (rating of less than 10), which are not suitable for agriculture. Under this system, soils deemed less than prime can function as prime soils when limitations such as poor drainage, slopes, or soil nutrient deficiencies are partially or entirely removed. The six grades, ranges in index rating, and definition of the grades as defined by the Natural Resources Conservation Service are provided below in **Table 4.2-2**.

**TABLE 4.2-2
STORIE INDEX RATING SYSTEM**

Grade	Index Rating	Definition
1 – Excellent	80 through 100	Soils are well suited to intensive use for growing irrigated crops that are climatically suited to the region.
2 – Good	60 through 79	Soils are good agricultural soils, although they may not be so desirable as Grade 1 because of moderately coarse, coarse, or gravelly surface soil texture; somewhat less permeable subsoil; lower plant available water holding capacity, fair fertility; less well drained conditions, or slight to moderate flood hazards, all acting separately or in combination.
3 – Fair	40 through 59	Soils are only fairly well suited to general agricultural use and are limited in their use because of moderate slopes; moderate soil depths; less permeable subsoil; fine, moderately fine, or gravelly surface soil textures; poor drainage; moderate flood hazards; or fair to poor fertility levels, all acting alone or in combination.

Grade	Index Rating	Definition
4 – Poor	20 through 39	Soils are poorly suited. They are severely limited in their agricultural potential because of shallow soil depths; less permeable subsoil; steeper slope; or more clayey or gravelly surface soil textures than Grade 3 soils, as well as poor drainage; greater flood hazards; hummocky micro-relief; salinity; or fair to poor fertility levels, all acting alone or in combination.
5 – Very Poor	10 through 19	Soils are very poorly suited for agriculture, are seldom cultivated and are more commonly used for range, pasture, or woodland.
6 – Nonagricultural	Less than 10	Soils are not suited for agriculture at all due to very severe to extreme physical limitations, or because of urbanization.

Source: USDA-NRCS 2010

Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP) was established in 1982 to continue the Important Farmland mapping efforts begun in 1975 by the U.S. Department of Agriculture, Natural Resources Conservation Service. The intent of the NRCS was to produce agricultural resource maps based on soil quality and land use across the nation. As part of the nationwide agricultural land use mapping effort, the NRCS developed a series of definitions known as Land Inventory and Monitoring (LIM) criteria. The LIM criteria classified the land’s suitability for agricultural production; suitability included both the physical and chemical characteristics of soils and the actual land use. Important Farmland Maps are derived from the NRCS soil survey maps using the LIM criteria.

Since 1980, the State of California has assisted the NRCS with completing its mapping in the state. The FMMP was created in the California Department of Conservation (DOC) to continue the mapping activity with a greater level of detail. The DOC applied a greater level of detail by modifying the LIM criteria for use in California. The LIM criteria in California utilize the Soil Capability Classification and Storie Index Rating systems, but also consider physical conditions such as a dependable water supply for agricultural production, soil temperature range, depth of the groundwater table, flooding potential, rock fragment content, and rooting depth (DOC 2004).

Important Farmland Maps for California are compiled using the modified LIM criteria, as described above, and current land use information. The minimum mapping unit is 10 acres unless otherwise specified. Units of land smaller than 10 acres are incorporated into the surrounding classification. The Important Farmland Maps identify five agriculture-related categories (Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, and Grazing Land) and two nonagricultural categories (Urban and Built-Up Land and Other Land). Each category is summarized below, based on *A Guide to the Farmland Mapping and Monitoring Program* (2004), prepared by the DOC.

Prime Farmland

Prime Farmland is considered land with the best combination of physical and chemical features able to sustain the long-term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. The land must have been producing irrigated crops at some time during the two update cycles (a cycle is equivalent to 2 years) prior to the mapping date (DOC 2004).

4.2 AGRICULTURAL RESOURCES

Farmland of Statewide Importance

Farmland of Statewide Importance is considered land similar to Prime Farmland, but with minor shortcomings such as greater slopes or with less ability to hold and store moisture. The land must have been used for the production of irrigated crops at some time during the two update cycles prior to the mapping date (DOC 2004).

Unique Farmland

Unique Farmland is land of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated but may include nonirrigated orchards or vineyards, as found in some climatic zones in California. The land must have been cultivated at some time during the two update cycles prior to the mapping date (DOC 2004).

Farmland of Local Importance

Farmland of Local Importance is land of importance to the local agricultural economy, as determined by each county's board of supervisors and a local advisory committee. Farmland of Local Importance in Imperial County includes lands which do not qualify as Prime, Statewide, or Unique, but are currently irrigated crops or pasture or nonirrigated crops; lands that would meet the Prime or Statewide designation and have been improved for irrigation, but are now idle; and lands that currently support confined livestock, poultry operations, and aquaculture (DOC 2004).

Grazing Land

Grazing Land is considered land on which the existing vegetation, whether grown naturally or through management, is suited to the grazing of livestock. The minimum mapping unit for this category is 40 acres (DOC 2004).

Urban and Built-Up Land

Urban and Built-Up Land is considered land occupied with structures with a building density of at least one unit to 1.5 acres. Uses may include, but are not limited to, residential, industrial, commercial, construction, institutional, public administration purposes, railroad yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures, and other development purposes. Highways, railroads, and other transportation facilities are mapped as part of this unit if they are part of a surrounding urban area (DOC 2004).

Other Land

Other Land is considered land that is not included in any other mapping categories. The following uses are generally included: rural developments, brush, timber, government land, strip mines, borrow pits, and a variety of other rural land uses (DOC 2004).

The FMMP regards four of the categories—Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance—as “important farmland.” Based on the most recent FMMP map and report (2006), Imperial County currently has approximately 543,140 acres of important farmland.

As part of the FMMP, the Department of Conservation produces a Land Conversion Report to accompany each biennially updated Important Farmland Series map. A total of 543,140 acres were used as agricultural land in 2006 in Imperial County, which represented a net loss of 2,472

acres from 2004. The updated Land Conversion Report indicated there was a slight increase in Unique Farmland (148 acres), while the other three important farmland categories represented losses (2,620 acres combined) in Imperial County. These fluctuations in farmland acreages result from increasing mapping capabilities available to the FMMP program, including updated aerial photographs. It is noteworthy that Urban and Built-Up Land increased by 539 acres from 2004 to 2006 (DOC 2006).

Land Evaluation and Site Assessment Model

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, the California Agricultural Land Evaluation and Site Assessment (LESA) Model provides an acceptable methodology to ensure that potentially significant effects on the environment of agricultural land conversions are quantitatively and consistently considered in the environmental review process. This model evaluates measures of soil resource quality, project size, water resource availability, surrounding agricultural lands, and surrounding protected resource lands. For a given project, the factors are rated, weighted, and combined, resulting in a Land Evaluation sub-score and a Site Assessment sub-score. The sub-scores are combined to determine a single numeric score. A project's single numeric score becomes the basis for making a determination of a project's potential impact (DOC 2006).

Conversion of Agricultural Land

The Farmland Mapping and Monitoring Program monitors conversion of farmland in California. Reports from the period 1992 to 2004 revealed a trend toward increased conversion in Imperial County. The shifts to Urban and Built-Up Land from the various FMMP categories are shown in Table 4.2-3.

**TABLE 4.2-3
SOURCES OF URBAN LAND CONVERTED FROM
FARMLAND IN IMPERIAL COUNTY 1992–2004 (IN ACRES)**

Years	Shifts from Agricultural Land to Urban and Built-Up Land				Total
	Prime	Statewide & Unique	Other Land & Water	Grazing & Local	
1992–1994 ¹	82	601	19	0	702
1998–2000 ²	54	226	165	-79	366
2002–2004 ³	218	829	-138	277	1,186

Source: DOC 1996¹, 2002², 2006³

The report covering the period from 1992 to 1994 revealed that the county's rate of conversion dropped 66 percent over the previous reporting period. It dropped again by 47 percent between 1994 and 2000. In contrast, for the period 2002–2004, Imperial County moved to the top of the urbanizing county list. This was the first update in which the county's urbanization exceeded 1,000 acres, more than 88 percent of which took place on what had been irrigated farmland (1,047 of 1,186 acres). Housing, water treatment and geothermal facilities, and border-related industrial uses near Calexico were the primary new land uses (DOC 2006).

4.2 AGRICULTURAL RESOURCES

PROJECT SITE

Project Site

The project site is currently designated for agriculture land uses and zoned for general agriculture and geothermal uses. The site is currently in use for the cultivation of alfalfa. The site also contains ruderal plant species associated with agriculture and surface disturbance.

The project site consists of 1,058.3 acres of Prime Farmland, 1,658.0 acres of Farmland of Statewide Importance, 19.6 acres of Farmland of Local Importance, 5.0 acres of Unique Farmland, and 274.2 acres of Urban and Built-Up Land and Other Land (see **Figure 4.2-1**). The site does not contain any properties under Williamson Act contracts (see **Figure 4.2-2**).

Because the project site encompasses numerous parcels under different ownership, the current agricultural operations will vary depending upon the property owner. Specifically, the agricultural conditions will depend on the location, time of year, ownership, and/or the presence of a fallow contract with the IID, a given parcel within the project site could be fallow or under active production. At the time the power plant site was purchased, it was planted in alfalfa (summer 2008). It has been fallow since that time.

The site of the Brawley Wastewater Treatment Plant (BWWTP) is developed and does not contain any Important Farmland, active agricultural operations, or property under a Williamson Act contract. Furthermore, the site is not zoned for agricultural use.

Production and Soil Characteristics

The power plant site is located on Imperial silty clay wet soils. The additional soils on the project site include Badland; Fluvaquents, Saline; Glenbar Clay Loam, Wet; Holtville Silty Clay, Wet; Imperial Silty Clay, Wet; Imperial-Glenbar Silty Clay Loams, Wet, 0 to 2 Percent Slopes; Indio Loam, Wet; Indio-Vint Complex; Meloland Very Fine Sandy Loam, Wet; Vint Loamy Very Fine Sand, Wet; and water. The Soil Capability Classification, Storie Index grade, and designation as Prime Farmland or Farmland of Statewide Importance are presented for each soil type on the project site in **Table 4.2-4**.

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive land-forming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management.

Land capability class definitions are as follows: Class I contains soils having few limitations for cultivation; Class II contains soils having some limitations for cultivation; Class III contains soils having severe limitations for cultivation; Class IV contains soils having very severe limitations for cultivation; Class V contains soils unsuited to cultivation, although pastures can be improved and benefits from proper management can be expected; Class VI contains soils unsuited to cultivation, although some may be used provided unusually intensive management is applied; Class VII contains soils unsuited to cultivation and having one or more limitations which cannot be corrected; Class VIII contains soils and landforms restricted to use as recreation, wildlife, water supply, or aesthetic purposes (USDA-NCRS 2010).



Source: Bing Aerial Map, Imperial County, CA Dept. of Conservation FMMP 2008, PMC

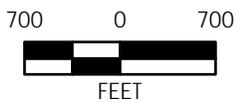
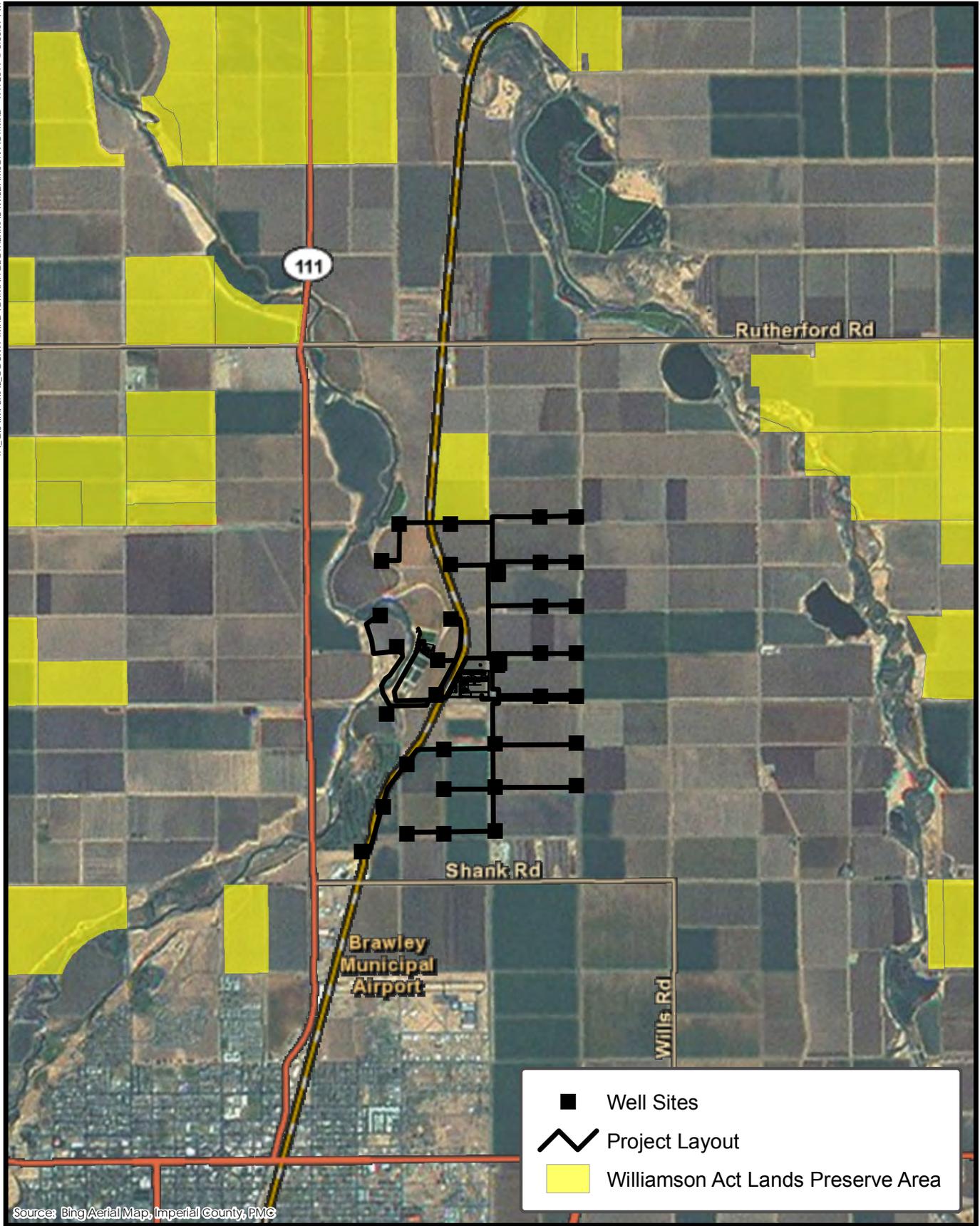


Figure 4.2-1
FMMP Designations on the Project Site



Source: Bing Aerial Map, Imperial County, PMC



Figure 4.2-2
Williamson Act Lands

**TABLE 4.2-4
ON-SITE SOIL CAPABILITY CLASSIFICATION AND STORIE INDEX GRADE**

Soil Map Symbol and Name	Soil Capability Classification (Irrigated/Non-irrigated)	Storie Index Grade
102 – Badland	n/a/VIIIe	8 – Grade 6
104 – Fluvaquents, Saline	n/a/VIIIw	3 – Grade 6
106 – Glenbar Clay Loam, Wet	IIw-3/VIIIw	37 – Grade 4
110 – Holtville Silty Clay, Wet	IIw-5/VIIIw	30 – Grade 4
114 – Imperial Silty Clay, Wet	IIIw-6/VIIIw	22 – Grade 4
115 – Imperial-Glenbar Silty Clay Loams, Wet, 0 to 2 percent slopes	IIIw-6/VIIIw	34 – Grade 4
118 – Indio Loam, Wet	11w-1/VIIIw	60 – Grade 2
119 – Indio-Vint Complex	IIs-1/VIIIe	90 – Grade 1
122 – Meloland Very Fine Sandy Loam, Wet	III/VII	3 – Grade 6
142 – Vint Loamy Very Fine Sand, Wet	IIw-4/VIIIe	100 – Grade 1

Source: USDA-NRCS 2010

Three soils have a Storie Index Grade of not suited for farming, four have a grade of 4, which are poorly suited for farming, two have a grade of fair, and one has a grade of good (USDA-NRCS 2010).

4.2.2 REGULATORY FRAMEWORK

STATE

WILLIAMSON ACT

The California Land Conservation Act, also known as the Williamson Act, was adopted in 1965 in order to encourage the preservation of the state's agricultural lands and to prevent their premature conversion to urban uses. In order to preserve these uses, the Act established an agricultural preserve contract procedure by which any county or city within the state taxes landowners at a lower rate, using a scale based on the actual use of the land for agricultural purposes, as opposed to its unrestricted market value. In return, the owners guarantee that these properties will remain under agricultural production for at least a ten-year period. The contract is renewed automatically on an annual basis unless the owner files a notice of non-renewal. In this manner, each agricultural preserve contract (at any given date) is always operable at least nine years into the future. Prime Farmland under the Williamson Act includes land that qualifies as Class I and Class II in the Soil Capability Classification System or land that qualifies for rating 80 to 100 in the Storie Index Rating. The proposed project site is not subject to any Williamson Act contracts.

4.2 AGRICULTURAL RESOURCES

IMPERIAL COUNTY GENERAL PLAN

The General Plan Agricultural Element policies related to the proposed project are identified below. **Table 4.2-3** summarizes the project's consistency with the applicable General Plan land use goals and objectives. While this Draft EIR analyzes the proposed project's consistency with the General Plan pursuant to State CEQA Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

**TABLE 4.2-3
PROJECT CONSISTENCY WITH APPLICABLE GENERAL PLAN LAND USE GOALS AND OBJECTIVES**

General Plan Goals and Objectives	Consistency with General Plan	Analysis
<p>Policy #1 – Preservation of Important Farmland <u>Program:</u> No agricultural land designated except as provided in Exhibit C shall be removed from the Agriculture category except where needed for use by a public agency, for geothermal purposes, where a mapping error may have occurred, or where a clear long-term economic benefit to the County can be demonstrated through the planning and environmental review process. The Board (or Planning Commission) shall be required to prepare and make specific findings and circulate same for 60 days (30 days for parcels considered under Exhibit C of this element) before granting final approval of any proposal which removes land from the Agriculture category.</p>	Yes	The proposed project is a proposed geothermal facility.
<p>Policy #2 – Development Patterns and Locations on Agricultural Land <u>Program:</u> All non-agricultural uses in any land use category shall be analyzed during the subdivision, zoning, and environmental impact review process for their potential impact on the movement of agricultural equipment and products on roads located in the Agriculture category, and for other existing agricultural conditions which might impact the project, such as noise, dust, or odors.</p>	Yes	The proposed project would utilize the existing roadway and rail services for ongoing agriculturally related purposes. The proposed project would not preclude the ongoing use of these transportation facilities for any other agriculturally related use. Additional circulation information is discussed in Section 4.12, Transportation and Circulation.
<p>Policy #4 – Water Availability and Conservation <u>Program:</u> All subdivisions and discretionary projects which require the extension of water service in excess of that necessary for a single residence shall include an analysis of water use impacts as part of the environmental review process. This shall include potential growth inducing impacts affecting continued agricultural uses in the vicinity of the project where appropriate.</p>	Yes	Impacts associated with water use are addressed in Section 4.13, Utilities. This section identifies that there is adequate water to serve the project. Growth-inducing impacts are addressed in Section 7.0 of the Draft EIR.

**Non-applicable policies and programs have been omitted.*

IMPERIAL COUNTY RIGHT-TO-FARM ORDINANCE

The County Board of Supervisors recognized the potential threats to agricultural productivity posed by increased nonagricultural land uses, and on August 7, 1990, approved the Right-to-Farm Ordinance, which permits operation of properly conducted agricultural operations within the county, and is intended to reduce the loss to the county of its agricultural resources and promote a good neighbor policy by advising purchasers and users of adjacent properties about the potential problems and inconveniences associated with agricultural operations. The ordinance also establishes a County Agricultural Grievance Committee to settle disputes between agriculturalists and adjacent property owners (Imperial County 1993).

4.2.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following State CEQA Guidelines Appendix G. An impact is considered significant if the project would:

- 1) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use.
- 2) Conflict with existing zoning for agricultural use, or a Williamson Act contract.
- 3) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)).
- 4) Result in the loss of forest land or conversion of forest land to non-forest use.
- 5) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland to nonagricultural use or conversion of forest land to non-forest use.

METHODOLOGY

Evaluation of potential land use impacts of the proposed East Brawley Geothermal Development project was based on review of the Imperial County General Plan, the Imperial County Zoning Code, and field review of the surrounding area. The agricultural analysis is based on information gathered from the Imperial County General Plan Agricultural Element. Information and regulations provided by the U.S. Department of Agriculture, Soil Conservation Service, and Farmland Mapping and Monitoring Program were reviewed and evaluated for the project site. The proposed project site is not in a Williamson Act contract. Additionally, the proposed project is not defined as forest land or timberland; these issues will not be discussed further in the Draft EIR.

4.2 AGRICULTURAL RESOURCES

PROJECT IMPACTS AND MITIGATION MEASURES

Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance and Conflicts with Agricultural Uses and Land Use Designations

Impact 4.2.1 The proposed project includes the development of an industrial facility on land designated Prime Farmland. The conversion of the farmland is considered a **less than significant** impact.

The proposed geothermal project, including wells and pipelines, would remove 188.75 acres currently under agricultural production. However, according to the CUP application prepared for the project, the disturbed lands, except for possibly the power plant site, would be returned to agricultural use once the wells are abandoned. Therefore, the pipeline portions of the site would be temporarily converted from active agricultural lands (if they are active). Specifically, the pipelines will be removed and the well pads reclaimed. As such, the project would temporarily convert portions of the project site to nonagricultural uses. The proposed project would remove 14.6 acres from Prime Farmland designation (refer to **Figure 4.2-1**). The proposed project would utilize the existing roadways for ongoing agricultural-related purposes. The remaining property that is under active agricultural production (2,844.5 acres) will remain unchanged. The project would not result in a conflict with the Imperial County Right-to-Farm Ordinance.

However, the project site is shown to contain Prime Farmland (14.6 acres) as defined by the California Department of Conservation Division of Land Resources Protection Farmland Mapping and Monitoring Program 2006 Map. The proposed project includes the development of a geothermal facility and would result in the conversion and direct loss of Prime Farmland to an industrial use. Because the disturbed lands, except for possibly the power plant site, would be returned to agricultural use once the wells are abandoned, the pipelines removed, and the well pads reclaimed, the project does not propose a permanent conversion of farmland. Additionally, although the proposed project would remove 14.6 acres from Prime Farmland designation, this is not a substantial acreage of Prime Farmland to impair existing future and existing agricultural operations.

Furthermore, the proposed project's power plant site develops a small portion of the currently fallow agricultural land and does not conflict with existing agricultural operations. The proposed project is a geothermal project and is consistent with Imperial County General Plan Policy #1, Preservation of Important Farmland, which allows geothermal projects to occur in areas that are designated farmland. Therefore, the project is not considered a change to future nonagricultural uses and is allowed. As such, the proposed project is considered to have a **less than significant** impact on conversion of farmland.

Mitigation Measures

None required.

4.2.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The setting for considering cumulative impacts to agricultural resources includes all active and inactive agricultural lands, including lands identified as having agricultural soils classifications, in

Imperial County. Of the county's 4,597 square miles, or 2,942,080 acres, approximately 20 percent of the land is irrigated for agricultural purposes, particularly in the central area known as Imperial Valley. Two other major irrigated areas are Bard Valley in the southeast corner of the county and Palo Verde Valley in the northeast corner (County of Imperial 1996).

The cumulative setting for agricultural resources includes buildout anticipated in the Imperial County General Plan as well as existing, approved, and reasonably foreseeable projects as described in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this Draft EIR. Buildout under the general plans of cities in the county, including the cities of Imperial to the south and Brawley to the north, would also contribute to cumulative development. **Table 4.0-1** in Section 4.0 identifies and describes projects that, along with the proposed project, could contribute incrementally to cumulative agricultural impacts through the conversion of agricultural land to nonagricultural uses. Under cumulative conditions, it is anticipated that the county would continue to have agricultural operations and land designated for agricultural use.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Agricultural Resources

Impact 4.2.2 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could result in impacts to agricultural resources. This would be a **less than cumulatively considerable** impact.

Table 4.0-1 identifies existing, proposed, and reasonably foreseeable projects in the county that have converted or could result in the conversion of farmland to nonagricultural uses.

As discussed under the analysis of Impact 4.2.1, the proposed project is consistent with County of Imperial General Plan Policy #1, which allows geothermal projects to occur in areas that are designated farmland. The remaining property that is under active agricultural production (2,844.5 acres) will remain unchanged. The disturbed lands, except for possibly the power plant site, would be returned to agricultural use once the wells are abandoned, the pipelines removed, and the well pads reclaimed. As such, the project would temporarily convert portions of the project site to nonagricultural use. Therefore, the proposed project will result in the minimal temporary loss of farmland, 14.6 acres of Prime Farmland, 64.6 acres of Farmland of Statewide Importance, and 2.2 acres of Unique Farmland (refer to **Figure 4.2-1**), because the pipeline portions of the site would be temporarily converted from active agricultural lands (if they are active).

The proposed project is in compliance with General Plan EIR policies and mitigation measures. However, the project would still result in the conversion of Prime Farmland and Farmland of Statewide Importance to nonagricultural uses (79.2 acres). This conversion would result in an incremental contribution to the overall loss of agricultural lands in Imperial County. Once farmland is used for urban development, it is essentially lost as an agricultural resource. Because no new agricultural land can be created to replace lost agricultural lands, no mitigation exists to fully offset the loss of agricultural lands. Therefore, the proposed project, in combination with the development of other existing, proposed, and reasonably foreseeable projects in the county, would result in a loss of agricultural resources, which could be considered a cumulatively considerable impact. Due to the anticipated conversion of some agricultural lands to geothermal uses, and because the proposed project is consistent with the County's land use designation of A-2-G, the conversion of agricultural land for geothermal use was anticipated by the County during the development of the General Plan. Impacts to the loss of agricultural land

4.2 AGRICULTURAL RESOURCES

are considered **less than cumulatively considerable**. Also, because the disturbed lands would be returned to agricultural use and the proposed project does not propose a substantial acreage of Prime Farmland that would impair existing and future agricultural operations, impacts to the loss of agricultural land are considered **less than cumulatively considerable**.

Mitigation Measures

None required.

REFERENCES

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4.3 AIR QUALITY

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) for the proposed East Brawley Geothermal Development project analyzes the potential impacts on air quality resulting from the proposed project. The air quality impact analysis (see **Appendix D**) was prepared by Environmental Management Associates, Inc. (2010) using methodologies and assumptions recommended within the various guidelines of the Imperial County Air Pollution Control District (ICAPCD). Regional and local air quality conditions are presented, along with pertinent air quality standards and regulations. Mitigation measures are recommended, as necessary, to reduce significant air quality impacts. An analysis of the proposed project's individual and cumulative contribution to climate change is provided in Section 4.14 of this Draft EIR.

4.3.1 EXISTING SETTING

AIR POLLUTION CLIMATOLOGY

The entire Imperial County, including the project site, lies within the Salton Sea Air Basin (SSAB), which is under the jurisdiction of ICAPCD. The SSAB consists of all of Imperial County and the southeast portion of Riverside County.

The SSAB is generally an arid desert region, with a significant portion located below sea level. A semi-permanent high-pressure cell blocks mid-latitude storms and causes sunny skies most of the time. The high-pressure zone tends to be weaker in the winter and it is during this time that the SSAB usually receives its average 2.8 inches of yearly precipitation. The wettest month in the SSAB is December, averaging 0.5 inches of rainfall, while the driest month is June, with measurable rainfall recorded only twice since 1914. Rainfall is highly variable, with precipitation from a single heavy storm event one year exceeding the entire annual total during a drought year. Average humidity can range from 28 percent in summer to 52 percent in winter. A large daily oscillation of temperature produces a corresponding large variation in the relative humidity (Imperial County 1993).

These climatic conditions are strongly influenced by the large-scale sinking and warming of air in the semi-permanent subtropical high-pressure center of the Pacific Ocean. The Peninsular Mountain range to the west blocks any coastal influence, such as cool and damp marine air. The geographic barriers and atmospheric conditions limit precipitation in the area. The flat terrain of the SSAB and the strong temperature differentials created by intense solar heating produce moderate winds and deep thermal convection. The combination of subsiding air, protective mountains, and distance from the ocean all combine to severely limit precipitation. As a result, the climate of the Imperial Valley is arid, with hot summers and mild winters. Temperatures exceed 100 degrees for more than 110 days out of the year, and there are more than 300 frost-free days per year. While summers are intensely hot, the climate for the rest of the year is mild.

Wind in the project area blows from west to east most of the time and high winds are occasionally experienced in the SSAB. Wind speeds in excess of 30 miles per hour occur most frequently in April and May. On an annual basis, strong winds (greater than 30 miles per hour) are observed 0.6 percent of the time; speeds of less than 6.8 miles per hour account for more than one-half of the observed winds (Imperial County 1993).

Regional air quality within the SSAB is affected by topography and atmospheric inversions. The area is generally very flat and bordered to the west by the Peninsular Mountain range and to the east by the Chocolate, Orocopia, and Cargo Muchacho mountains. The prevailing winds tend to come from the west-northwest through southwest. The mountains to the east act as physical barriers to the dispersion of airborne contaminants.

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The SSAB also experiences surface inversions almost every day of the year. These inversions are caused by the presence of the region's typical subtropical high-pressure cell, which causes the air mass aloft to sink. Air masses are large bodies of air with similar temperature and moisture content. An air mass aloft refers to the higher-altitude air mass which inductively suggests that there is a separate (and thus different in temperature and moisture content) air mass at ground level. As this air mass sinks, the temperature thereof rises through compressional heating, thus exceeding the temperature of the air below. This stable atmospheric condition, known as a subsidence inversion, becomes a nearly impenetrable barrier to the vertical mixing of pollutants. These inversions often last for long periods of time, which allows for air stagnation and the buildup of pollutants. During the winter, the area experiences radiation inversions in which the air near the ground surface cools by radiation, whereas the air higher in the atmosphere remains warmer. A shallow inversion layer is created between the two layers and precludes the vertical dispersion of air, thus trapping pollutants. Highest ozone levels are often associated with subsidence inversions.

AIR POLLUTANT PROPERTIES, EFFECTS, AND SOURCES

The following section describes the pollutants of greatest importance in Imperial County. It provides a description of the physical properties, the health effects and other effects of the pollutant, and the sources of the pollutant.

Ozone

Ozone (O₃) is what is known as a photochemical pollutant. It is not emitted directly into the atmosphere, but is formed by a complex series of chemical reactions between reactive organic gases (ROG), nitrogen oxide (NO_x), and sunlight. ROG and NO_x are emitted from automobiles, solvents, and fuel combustion, the sources of which are widespread throughout Imperial County. In order to reduce ozone concentrations, it is necessary to control the emissions of these ozone precursors. Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight. Ozone is a regional air pollutant. It is generated over a large area and is transported and spread by wind.

While ozone in the upper atmosphere protects the earth from harmful ultraviolet radiation, high concentrations of ground-level ozone can adversely affect the human respiratory system. Many respiratory ailments, as well as cardiovascular disease, are aggravated by exposure to high ozone levels. Ozone also damages natural ecosystems, such as forests and foothill communities, and damages agricultural crops and some man-made materials, such as rubber, paint, and plastics.

Particulate Matter

Suspended particulate matter (airborne dust) consists of particles small enough to remain suspended in the air for long periods. Respirable particulate matter (PM₁₀ and PM_{2.5}) includes particulates which are small enough to be inhaled, pass through the respiratory system, and lodge in the lungs, with resultant health effects. PM₁₀ consists of particulate matter that is 10 microns or less in diameter, and PM_{2.5} consists of particulate matter of 2.5 microns or less in size. PM₁₀ and PM_{2.5} comprise dust, sand, salt spray, metallic and mineral particles, pollen, smoke, mist, and acid fumes. Also of importance are sulfate (SO₄) and nitrates (NO₃), which are secondary particles formed as precipitates from photochemical reactions of gaseous sulfur dioxide (SO₂) and NO_x in the atmosphere. The actual composition of PM₁₀ and PM_{2.5} varies greatly with time and location depending on the sources of the material and meteorological conditions.

Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis, and respiratory illnesses in children. Recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non-health-related effects include reduced visibility and soiling of buildings.

Generally speaking, PM_{2.5} sources tend to be combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM₁₀ sources include these same sources plus roads and farming activities. Fugitive windblown dust and other area sources also represent sources of airborne dust in the SSAB.

Reactive Organic Gases

Reactive organic gases (ROG), also known as volatile organic compounds, are photochemically reactive hydrocarbons that are important for ozone formation. This definition excludes methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonates, methylene chloride, methyl chloroform, and various chlorofluorocarbons. There are no health standards for ROG separately. The main concern with ROG is its role in photochemical ozone formation. In addition, some compounds that make up ROG are also toxic. An example is benzene, which is a carcinogen.

The primary sources of ROG are mobile sources, solvents, farming operations and other area sources, and oil and gas production.

Nitrogen Oxides

Nitrogen oxides (NO_x) are a family of gaseous nitrogen compounds and are precursors to ozone formation. The major component of NO_x, nitrogen dioxide (NO₂), is a reddish-brown gas that is toxic at high concentrations. NO_x results primarily from the combustion of fossil fuels under high temperature and pressure.

Health effects associated with NO_x are an increase in the incidence of chronic bronchitis and lung irritation. Chronic exposure to NO₂ may lead to eye and mucous membrane aggravation, along with pulmonary dysfunction. NO_x can cause fading of textile dyes and additives, deterioration of cotton and nylon, and corrosion of metals due to production of particulate nitrates. Airborne NO_x can also impair visibility. NO_x is a major component of acid disposition in California. On-road and off-road motor vehicles and fuel combustion are the major sources of this air pollutant.

Carbon Monoxide

Carbon monoxide (CO) is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels and is emitted directly into the air (unlike ozone). Under most conditions, CO does not persist in the atmosphere and is rapidly dispersed. CO exceedances are most likely to occur in the winter, when relatively low inversion levels trap pollutants near the ground and concentrate the CO. Automobiles are the major source of CO in the Imperial Valley, although various industrial processes also emit CO through incomplete combustion of fuels. In high concentrations, CO can cause serious health problems in humans by limiting the red blood cells' ability to carry oxygen.

4.3 AIR QUALITY

Other Pollutants

Sulfur Dioxide

Sulfur dioxide (SO₂) is a colorless, irritating gas with a rotten egg smell formed primarily by the combustion of sulfur-containing fuels such as coal, fuel oil, and diesel fuels. Health effects include sore throats, coughing, and breathing problems. In addition, like nitrogen dioxide, sulfur dioxide changes in the atmosphere to acidic particles and sulfuric acid, which can injure both people and plants. It is rare in California to see levels of SO₂ high enough to cause these symptoms.

Lead

Lead is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. Lead was used until recently to increase the octane rating in auto fuel. Since gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels and the use of leaded fuel has been mostly phased out, the ambient concentrations of lead have dropped dramatically.

Hydrogen Sulfide

Hydrogen sulfide (H₂S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. The California ambient air quality standard for H₂S is 0.030 parts per million (ppm) for 1 hour. Hydrogen sulfide is extremely hazardous in high concentrations (800 ppm can cause death), especially in enclosed spaces. The Occupational Safety and Health Administration (OSHA) regulates workplace exposure to H₂S. The entire SSAB is unclassified for hydrogen sulfide attainment.

Odors

Odors are typically regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. It is also important to note that an unfamiliar odor is more easily detected and is more

likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

AIR QUALITY DESIGNATIONS AND CLASSIFICATIONS

Areas with air quality that exceed adopted air quality standards are designated as nonattainment areas for the relevant air pollutants. Nonattainment areas are sometimes further classified by degree (marginal, moderate, serious, severe, and extreme for ozone, and moderate and serious for carbon monoxide and PM₁₀) or status (nonattainment-transitional). Areas that comply with air quality standards are designated as attainment areas for the relevant air pollutants. Unclassified areas are those with insufficient air quality monitoring data to support a designation of attainment or nonattainment, but are generally presumed to comply with the ambient air quality standard. State Implementation Plans must be prepared by states for areas designated as federal nonattainment areas to demonstrate how the area will come into attainment of the exceeded federal ambient air quality standard.

As detailed in the Regulatory Framework discussion below, both the California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (EPA) have established air pollution standards in an effort to protect human health and welfare. Geographic areas are designated attainment if these standards are met and nonattainment if they are not met. In addition, each agency has several levels of classifications based on severity of the problem. For example, the SSAB is classified a serious nonattainment area for 24-hour particulate matter equal to or less than 10 microns in aerodynamic diameter (PM₁₀), a nonattainment area for particulate matter equal to or less than 2.5 microns in aerodynamic diameter (PM_{2.5}), and a moderate 8-hour ozone (O₃) nonattainment area, and it is an unclassified or attainment area for all other criteria air pollutants, as summarized in **Table 4.3-1**.

**TABLE 4.3-1
AIR QUALITY STANDARD ATTAINMENT STATUS – SALTON SEA AIR BASIN**

Pollutant	Designation/Classification	
	State	Federal
Ozone – 1-hour standard	Nonattainment	Revoked June 2005 ¹
Ozone – 8-hour standard	Nonattainment	Nonattainment – Moderate
PM ₁₀	Nonattainment	Nonattainment – Serious
PM _{2.5}	Unclassified	Nonattainment
CO	Attainment	Unclassified/Attainment
NO ₂	Attainment	Unclassified/Attainment
SO ₂	Attainment	Attainment
Lead (Particulate)	Attainment	No Designation/Classification
All Others	Attainment/Unclassified	No Federal Standard

Source: EMA 2010, p. 5

¹ Effective June 15, 2005, EPA revoked the federal 1-hour ozone standard, including associated designations and classifications.

4.3 AIR QUALITY

4.3.2 REGULATORY FRAMEWORK

AMBIENT AIR QUALITY STANDARDS

Both the EPA and CARB have established ambient air quality standards for common pollutants. These ambient air quality standards are levels of contaminants that represent safe levels which avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover criteria pollutants.

The federal and California ambient air quality standards are summarized in **Table 4.3-2** for important pollutants. The federal and state ambient standards were developed independently with differing purposes and methods, although both processes attempted to avoid health-related effects. As a result, the federal and state standards differ in some cases. In general, the California standards are more stringent. This is particularly true for ozone and particulate matter, which are the most problematic pollutants in Imperial County.

**TABLE 4.3-2
SUMMARY OF AMBIENT AIR QUALITY STANDARDS**

Pollutant	Averaging Time	California Standards ^(a, c)	National Standards ^(b, c)	
			Primary ^(d)	Secondary ^(e)
Ozone (O ₃)	1-hour	0.09 ppm (180 µg/m ³)	–	Same as Primary
	8-hour	0.070 ppm (137 µg/m ³)	0.075 ppm (147 µg/m ³)	
Particulate Matter (PM ₁₀)	AAM	20 µg/m ³	–	
	24-hour	50 µg/m ³	150 µg/m ³	
Fine Particulate Matter (PM _{2.5})	AAM	12 µg/m ³	15.0 µg/m ³	
	24-hour	No Standard	35 µg/m ³ (f)	
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	None
	8-hour	9 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	
	8-hour (Lake Tahoe)	6 ppm (7 mg/m ³)	–	
Nitrogen Dioxide (NO ₂)	AAM	0.030 ppm (56 µg/m ³)	0.053 ppm (100 µg/m ³)	Same as Primary
	1-hour	0.18 ppm (338 µg/m ³)	0.100 ppm	None
Sulfur Dioxide (SO ₂)	AAM	–	0.03 ppm (80 µg/m ³)	–
	24-hour	0.04 ppm (105 µg/m ³)	0.14 ppm (365 µg/m ³)	–
	3-hour	–	–	0.5 ppm (1,300 µg/m ³)
	1-hour	0.25 ppm (655 µg/m ³)	75 ppb	–

Pollutant	Averaging Time	California Standards ^(a, c)	National Standards ^(b, c)	
			Primary ^(d)	Secondary ^(e)
Lead	30-day Average	1.5 µg/m ³	–	–
	Calendar Quarter	–	1.5 µg/m ³	Same as Primary
Sulfates	24-hour	25 µg/m ³	No Federal Standards	
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m ³)		
Vinyl Chloride	24-hour	0.01 ppm (26 µg/m ³)		
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70%.		

Notes:

- a. California standards for O₃, CO (except Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, PM (PM₁₀ and PM_{2.5}), and visibility-reducing particles are values not to be exceeded. All others are not to be equaled or exceeded.
- b. National standards (other than O₃, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The O₃ standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM₁₀, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. For PM_{2.5}, the 24-hour standard is attained when 98 percent of daily concentrations, averaged over 3 years, are equal to or less than the standard.
- c. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses.
- d. The levels of air quality necessary to protect the public health.
- e. Air quality levels necessary to protect public welfare from any known or anticipated adverse effects of a pollutant.

AAM = Annual Arithmetic Mean

Source: CARB 2010\

FEDERAL

Federal Clean Air Act and Amendments

The early federal legislative response to air quality concerns consisted of the Air Pollution Control Act of 1955, the Clean Air Act of 1963, and the Air Quality Act of 1967. The goal of the Clean Air Act (CAA) of 1970, as stated by Congress in the 1977 CAA Amendments, was to protect and enhance the quality of the nation's air resources. The Clean Air Act Amendments of 1990 are extremely broad. The major titles of the 1990 Amendments address attainment of air quality standards, mobile source emissions, air toxics, acid rain, a new federal permit program, enforcement, and protection of stratospheric ozone. The titles that most substantially affect the air quality analysis of the proposed project are Title I (attainment and maintenance provisions) and Title II (mobile source provisions).

4.3 AIR QUALITY

STATE

Title I of the Clean Air Act Amendments of 1990

The goal of Title I is to attain federal air quality standards for six criteria pollutants: ozone (O₃), carbon monoxide (CO), particulate matter (PM), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and lead. Pollutant descriptions and associated health effects are summarized in **Table 4.3-3**. National ambient air quality standards (NAAQS) for these criteria pollutants are summarized in **Table 4.3-2** above. The 1990 Amendments to the federal Clean Air Act divided the nation into five categories of planning regions, depending on the severity of their pollution, and set new timetables for attaining the air quality standards. The categories range from marginal to extreme. Attainment deadlines are from 3 to 20 years, depending on the category.

Title I also requires each nonattainment area to submit a comprehensive inventory of actual emissions as part of a State Implementation Plan (SIP) revision to demonstrate the means for achieving federal standards by the established deadlines. Each nonattainment area must achieve a 15 percent reduction from its actual 1990 emissions inventory within 6 years. Thereafter, each area must achieve a 3 percent annual reduction.

Provisions of Section 182 of the 1990 Clean Air Act Amendments relate to ozone nonattainment areas and Sections 186 and 187 relate to carbon monoxide nonattainment areas. These sections emphasize strategies for reducing vehicle miles traveled. Section 182 requires submission of a SIP revision that identifies and adopts specific enforceable transportation control strategies and transportation control measures to offset any growth in emissions from growth in vehicle miles traveled or numbers of vehicle trips in such area to meet statutory requirements for demonstrating periodic emissions reduction requirements. Section 187 makes the same basic requirement applicable to carbon monoxide nonattainment areas. Section 188 sets forth requirements for PM₁₀ nonattainment areas.

TABLE 4.3-3
SUMMARY OF COMMON SOURCES AND EFFECTS OF CRITERIA POLLUTANTS

Pollutant	Description & Common Sources	Health & Welfare Effects
Carbon Monoxide	<ul style="list-style-type: none"> • A colorless, odorless gas. • Common sources include motor vehicle exhaust; indoor sources include kerosene wood-burning stoves. 	<ul style="list-style-type: none"> • Headaches, reduced mental alertness, heart attack, cardiovascular diseases, impaired fetal development, death. • Contributes to the formation of smog.
Sulfur Dioxide	<ul style="list-style-type: none"> • A colorless gas that dissolves in water vapor to form acid, and interacts with other gases and particulates in the air. • Common sources include coal-fired power plants, petroleum refineries, manufacture of sulfuric acid, and smelting of ores containing sulfur. 	<ul style="list-style-type: none"> • Eye irritation, wheezing, chest tightness, shortness of breath, lung damage. • Contributes to the formation of acid rain, visibility impairment, plant and water damage, aesthetic damage.
Nitrogen Dioxide	<ul style="list-style-type: none"> • Reddish brown, highly reactive gas. • Common sources include motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. 	<ul style="list-style-type: none"> • Increased susceptibility to respiratory infections, irritation of the lung and respiratory symptoms (e.g., cough, chest pain, difficulty breathing). • Contributes to the formation of smog, acid rain, water quality deterioration, global warming, and visibility impairment.

Pollutant	Description & Common Sources	Health & Welfare Effects
Ozone	<ul style="list-style-type: none"> Gaseous pollutant formed in the atmosphere from the combination of reactive organic gases and oxides of nitrogen in the presences of sunlight. Common sources include vehicle exhaust. 	<ul style="list-style-type: none"> Eye and throat irritation, coughing, respiratory tract problems, asthma, lung damage. Plant and ecosystem damage.
Lead	<ul style="list-style-type: none"> Metallic element. Common sources include metal refineries, lead smelters, battery manufacturers, iron and steel producers and use of leaded fuels by racing and aircraft industries. 	<ul style="list-style-type: none"> Anemia, high blood pressure, brain and kidney damage, neurological disorders, cancer, lowered IQ. Affects animal and plants, affects aquatic ecosystems.
Particulate Matter	<ul style="list-style-type: none"> Very small particles of dust, soot, or other matter, including tiny droplets of liquids. Common sources include diesel engines, power plants, industries, windblown dust, wood stoves. 	<ul style="list-style-type: none"> Eye irritation, asthma, bronchitis, lung damage, cancer, heavy metal poisoning, cardiovascular effects. Visibility impairment, atmospheric deposition, aesthetic damage, impaired plant photosynthesis.

Source: EPA 2010

Title II of the Clean Air Act Amendments of 1990

Title II of the 1990 Amendments, which contains provisions to control emissions from mobile sources, includes the following measures to reduce pollutants from mobile sources: (1) mandatory use of cleaner, reformulated gasoline in those cities with the most severe ozone problem, (2) use of cleaner fuels, such as methanol and natural gas, to meet particulate standards, and (3) requirements on auto manufacturers to reduce tailpipe emissions of hydrocarbons and oxides of nitrogen. Section 177 of Title II permits California to adopt stricter vehicle emission standards and allows other states to adopt California's stricter standards (see **Table 4.3-2**).

California Clean Air Act

The California Clean Air Act of 1988 (CCAA), amended in 1992, requires all air districts in the state to endeavor to achieve and maintain state ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and particulate matter by the earliest practicable date. California's ambient air quality standards are generally stricter than national standards for the same pollutants. California also has established its own standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles (**Table 4.3-2**).

Toxic Air Contaminants

Toxic air contaminants (TACs) in California are regulated primarily through the Tanner Air Toxics Act (AB 1807 [Statutes of 1983]) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588 [Statutes of 1987]). Assembly Bill (AB) 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted the EPA's list of hazardous air pollutants as TACs. Most recently, diesel PM was added to the CARB list of toxic air contaminants.

4.3 AIR QUALITY

Once a TAC is identified, CARB then adopts an airborne toxics control measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate best available control technology (BACT) to minimize emissions.

Assembly Bill 2588 requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

LOCAL

Imperial County Air Pollution Control District

The entire SSAB, which includes the project area, is under the jurisdiction of the Imperial County Air Pollution Control District (ICAPCD). ICAPCD is the local air quality agency and shares responsibility with CARB for ensuring that state and federal ambient air quality standards are achieved and maintained in the SSAB. Furthermore, ICAPCD adopts and enforces controls on stationary sources of air pollutants through its permit and inspection programs and regulates agricultural burning. Other ICAPCD responsibilities include monitoring ambient air quality, preparing clean air plans, planning activities such as modeling and maintenance of the emission inventory, and responding to citizen air quality complaints. Districts in state nonattainment areas are also responsible for developing and implementing transportation control measures necessary to achieve the state ambient air quality standards (**Table 4.3-2**).

Air quality in the area is a function of the criteria pollutants emitted locally, the existing regional ambient air quality, and the meteorological and topographic factors, which influence the intrusion of pollutants into the area from sources outside the immediate vicinity.

An Authority to Construct permit for the emissions associated with the drilling and flow testing of six project exploration wells was issued by ICAPCD. An Authority to Construct permit application for the proposed power plant and development wells was subsequently submitted to ICAPCD and amended to include the use of a regenerative thermal oxidizer (RTO) and caustic scrubber system, instead of the initially proposed scrubber system, to abate hydrogen sulfide and benzene air pollutant emissions from the facility. The permits will limit the allowable air emissions that can be released by the respective project facilities during construction and operations.

IMPERIAL COUNTY GENERAL PLAN

The County's General Plan contains two elements, the Conservation and Open Space Element and the Land Use Element, that set forth goals and objectives to improve air quality and protect the health and welfare of county residents. Goals and objectives are accomplished by seeking to comply with current federal and state requirements regarding air quality as well as by cooperating with ICAPCD in their mission to reduce air pollutants. **Table 4.3-4** analyzes the proposed project's consistency with County of Imperial General Plan air quality objectives.

While this Draft EIR analyzes the proposed East Brawley Geothermal Development project's consistency with the Imperial County General Plan, pursuant to CEQA Section 15125(d), it is the Board of Supervisors that will make the determination of the project's consistency with the identified General Plan policies.

**TABLE 4.3-4
PROJECT CONSISTENCY WITH APPLICABLE GENERAL PLAN GOALS AND OBJECTIVES**

General Plan Goals and Objectives	Consistency with General Plan	Analysis
Conservation and Open Space Element		
Objective 9.1. Ensure that all facilities shall comply with current federal and state requirements for attainment of air quality objectives.	Yes	Implementation of the proposed project would result in a privately owned 49.9 net megawatt geothermal power plant north of the City of Brawley in unincorporated Imperial County. Regulation of new potential air pollution sources are the responsibility of ICAPCD. Direct sources of air contaminants are required to obtain specific operational permits from ICAPCD. All new development requiring environmental review would be subject to ICAPCD review, which may impose mitigation measures to reduce any air quality impacts to a less than significant level. The proposed project is required to comply with the applicable air quality mitigation measures established in the Imperial County General Plan EIR, which have been adopted as goals and objectives.
Objective 9.2. Cooperate with all federal and state agencies in the effort to attain air quality objectives.	Yes	See response to Conservation and Open Space Objective 9.1.
Land Use Element		
Objectives 9.6. Incorporate the strategies of the Imperial County Air Quality Attainment Plan (AQAP) in land use planning decisions. The policies stated in the 1991 AQAP include L-1, Planning Compact Communities; L-2, Providing for Mixed Land Use; L-3, Balancing Jobs and Housing; and L-4, Circulation Management.	Yes	ICAPCD has recently adopted the Final 2009 8-Hour Ozone Modified Air Quality Management Plan, the Final 2008 Reasonably Available Control Technology State Implementation Plan, and the Final PM ₁₀ 2009 State Implementation Plan with the purpose of achieving attainment for federal and state ozone and PM ₁₀ standards. All new development requiring environmental review would be subject to ICAPCD review, which may impose mitigation measures to reduce any air quality impacts to a less than significant level. Additionally, the proposed project is required to comply with the applicable air quality mitigation measures established in the Imperial County General Plan EIR, which have been adopted as policies and objectives.
Objective 9.7. Implement a review procedure for land use planning and discretionary project review which includes the Imperial County Air Pollution Control District.	Yes	See response to Land Use Objective 9.6.

**Non-applicable policies and programs have been omitted.*

4.3 AIR QUALITY

4.2.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following State CEQA Guidelines Appendix G. A significant impact to air quality would occur if implementation of the proposed project would result in the following:

- Conflict with or obstruct implementation of the acceptable air quality plan.
- Violate any air quality standard or contributes substantially to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.

METHODOLOGY

The following analysis is based primarily on the Air Quality Impact Analysis prepared for the proposed project by Environmental Management Associates, Inc. (2010) (see **Appendix D**). Emission estimates for grading, paving, and construction associated with the power plant, and the grading and construction of each well pad, were estimated using the CARB-approved URBEMIS2007 model (version 9.2.4), a computer program that uses standard EPA and CARB techniques to estimate air pollution emissions for various land uses, area sources, construction projects, and project operations.

The analysis of air quality issues follows the guidance provided in the State CEQA Guidelines. The Guidelines state that a project will result in a potentially significant impact if it would violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, result in a net increase of any criteria pollutant for which the region is in nonattainment, create or contribute to a non-stationary source "hot-spot" (primarily carbon monoxide), expose sensitive receptors to substantial pollutant concentrations, or create objectionable odors that affect a substantial number of people.

PROJECT IMPACTS AND MITIGATION MEASURES

Conflict with or Obstruct Implementation of Applicable Air Quality Plans

Impact 4.3.1 Implementation of the proposed project would not result in violations or contributions to existing violations of air quality standards and does not therefore conflict with one or more applicable air quality plans. This impact is considered **less than significant with mitigation**.

The proposed project has a negligible potential to conflict with or obstruct the implementation of applicable ICAPCD air quality plans (Final 2009 8-Hour Ozone Modified Air Quality Management Plan, Final 2008 Reasonably Available Control Technology State Implementation

Plan, and Final PM₁₀ 2009 State Implementation Plan). These documents constitute the region's State Implementation Plan (SIP). California's SIPs are a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, state regulations, and federal controls describing how the state will attain national ambient air quality standards (NAAQS) for ozone and PM₁₀. State law makes CARB the lead agency for all purposes related to the SIP. Local air districts, including the Imperial County Air Pollution Control District, prepare SIP elements and submit them to CARB for review and approval. Generally, project compliance with all of the ICAPCD rules and regulations results in conformance with the state and ICAPCD air quality plans. The proposed project has prepared and submitted applications to ICAPCD for permits (Authority to Construct) for the power plant and production wells and injection wells that document how the project would comply with all applicable ICAPCD rules, regulations, and requirements for controlling emissions of the nonattainment air pollutants and their precursors.

ICAPCD Rule 925 establishes the conformity criteria and procedures necessary to ensure that federal actions conform to the SIP and meet the provisions of the Clean Air Act. In general, this rule ensures that all criteria air pollutant emissions are specifically identified and accounted for in the SIP's attainment or maintenance demonstration as well as conformance to a SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. Since the project is proposed in a federally classified nonattainment area, the provisions of the final rule for conformity apply to the project for PM₁₀ and O₃. However, actions are exempted when the totals of direct and indirect emissions are below specified emissions levels [40 CFR Section 51.853(b)1] (EMA 2010, p. 12). The applicable level is 70 tons per project per year for PM₁₀ in a serious nonattainment area. ROG and NO_x, as precursors to O₃, are governed in an O₃ nonattainment area, and the applicable levels are 100 tons per year per project in an O₃ nonattainment area that is not serious or extreme and also in an area that is outside an O₃ transport region.

Maximum annual PM₁₀ emissions from the project are anticipated to be less than 25 tons, which would occur during project operations, and are less than the specified 70 tons per year threshold (EMA 2010, p. 12). Maximum annual ROG and NO_x emissions, which would also occur during the operations phase, would be just under 30 and 5 tons, respectively, and are also less than the applicable 100 tons per year threshold (EMA 2010, p. 12). (Refer to **Table 4.2-6** below for emissions totals.)

Nevertheless, the provisions of the final rule will apply in a nonattainment area if the emissions of concern are above 10 percent of this area's total emissions [40 CFR Section 51.853(i)]. The SIP totals for Imperial County are approximately 24,000 tons per year for PM₁₀, 15,000 tons per year for ROG, and 17,000 tons per year for NO_x. Therefore the proposed project's anticipated annual PM₁₀, ROG, and NO_x emissions of less than 25 tons, 30 tons, and 5 tons per year, respectively, would be less than 10 percent of the respective regional emissions (EMA 2010, p. 12). Thus, the proposed project is exempt from any further review for conformity determination for PM₁₀ and O₃.

Imperial County General Plan Land Use Element Objective 9.6 mandates the incorporation of the air quality impact reduction strategies of ICAPCD's air quality plans. ICAPCD recently adopted the Final 2009 8-Hour Ozone Modified Air Quality Management Plan, the Final 2008 Reasonably Available Control Technology State Implementation Plan, and the Final PM₁₀ 2009 State Implementation Plan with the purpose of achieving attainment for federal and state ozone and PM₁₀ standards. The proposed project would be subject to ICAPCD review (i.e., Authority to Construct permit) as well as the air quality impact reduction strategies of ICAPCD's air quality plans as mandated by the County Land Use Element's Objective 9.6.

4.3 AIR QUALITY

As the proposed project is required to comply with all applicable ICAPCD rules, regulations, and requirements for controlling emissions of the nonattainment air pollutants and their precursors, it would not conflict with or obstruct implementation of any air quality plans. This impact is **less than significant**.

Mitigation Measures

None required.

Violate an Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation

Impact 4.3.2 Construction of the proposed project would result in short-term emissions of criteria air pollutants from construction equipment operation and soil disturbances, potentially violating or contributing to an existing violation of one or more air quality standards. This impact is **less than significant with mitigation**.

Construction of the power plant, new access roads, and pipelines, as well as the proposed upgrades to the City of Brawley Wastewater Treatment Plant (BWWTP), would produce fugitive dust from site grading and equipment movement. Construction of the power plant would directly disturb a total of about 15 acres of land, and another 10 acres would be disturbed for the temporary, adjacent equipment laydown, fabrication, and construction parking area (although the equipment laydown, fabrication, and construction parking area would be reclaimed following the completion of construction). In addition, up to 40 new 2.6-acre well pads (which is a conservative number of wells) would be constructed, disturbing an additional 104 acres over the life of the project. The upgrades to the BWWTP are not anticipated to result in any ground disturbance; however, as a conservative measure the air quality study assumed that these upgrades would disturb an additional 3 acres. Construction of the BWWTP improvements is assumed to occur over an approximately 11-month period; however, the first few months will be dedicated to detailed design and procurement. Foundation construction will occur during months 3–6; mechanical and electrical construction during months 6–9; and startup and commissioning in months 9–11.

Because 5 or more acres of land would be disturbed by construction activity, the proposed project is required to develop and implement a dust control plan consistent with the ICAPCD Rule 801 requirements for construction activities. The purpose of this rule is to reduce the amount of PM₁₀ entrained in the ambient air as a result of emissions generated from construction and other earthmoving activities by requiring actions to prevent, reduce, or mitigate PM₁₀ emissions. In addition, the project is required to adopt best available control measures to minimize emissions from surface-disturbing activities to comply with ICAPCD Regulation VIII (Fugitive Dust Rules). These measures include the following:

- All disturbed areas, including bulk material storage which is not being actively utilized, shall be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by using water, chemical stabilizers, dust suppressants, tarps, or other suitable material such as vegetative ground cover.
- All on-site and off-site unpaved roads will be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants, and/or watering.

- All unpaved traffic areas of 1 acre or more with 75 or more average vehicle trips per day will be effectively stabilized and visible emission shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants, and/or watering.
- The transport of bulk materials shall be completely covered unless 6 inches of freeboard space from the top of the container is maintained with no spillage and loss of bulk material. In addition, the cargo compartment of all haul trucks is to be cleaned and/or washed at delivery site after removal of bulk material.
- All track-out or carry-out will be cleaned at the end of each workday or immediately when mud or dirt extends a cumulative distance of 50 linear feet or more onto a paved road within an urban area.
- Bulk material handling or transfer shall be stabilized prior to handling or at points of transfer with application of sufficient water, chemical stabilizers, or by sheltering or enclosing the operation and transfer line.
- The construction of any new unpaved road is prohibited within any area with a population of 500 or more unless the road meets the definition of a temporary unpaved road. Any temporary unpaved road shall be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emission by paving, chemical stabilizers, dust suppressants and/or watering. (ICAPCD 2007)

Construction of Power Plant and Wastewater Treatment Plant Upgrade

The maximum annual air pollutant emissions estimated by URBEMIS (abated using the methods described above) for construction of the power plant and each well pad is provided in **Table 4.3-5**. The projected emissions resulting from upgrades to the BWWTP have been factored into the overall construction schedule.

**TABLE 4.3-5
MAXIMUM ESTIMATED AIR POLLUTANT EMISSIONS
FROM CONSTRUCTION ACTIVITIES¹**

Source	ROG ²	NO _x	CO	SO ₂	PM ₁₀
	Tons per Year				
Site Construction 2010 ¹	0.10	0.76	0.44	0.00	1.33
Site Construction 2011 ¹	5.61	6.66	14.57	0.01	1.93
Site Construction 2012 ¹	3.34	5.94	14.40	0.01	0.34
Tons per Pad					
Well Pad Construction	0.03	0.28	0.15	0.00	0.07

¹ Assumes construction begins November 1, 2010, and ends January 30, 2012, and assumes BWWTP construction begins December 1, 2011, and ends October 31, 2012.

² Reactive organic gases (ROG) are non-methane organic compound emissions that are assumed to be precursors to the formation of secondary photochemical oxidant air pollutants in the atmosphere, including ozone.

Source: EMA 2010, p. 6

4.3 AIR QUALITY

For the purposes of this analysis, it is anticipated that construction activities and associated emissions will be completed within a 15-month period. There will be a 2-month overlap of the 11-month BWWTP construction added to the power plant construction, resulting in a total of 24 months for the construction phase. Up to 60 workers would commute to the project area by passenger vehicles to the project site during peak BWWTP construction, but the combined peak traffic will remain below 200 workers commuting to the project site during the combined peak period. These emissions are small and their impacts would be low (EMA 2010, p. 6). Construction vehicles will release fuel combustion emissions during site construction activities. Up to 200 workers will also commute by passenger vehicles to the project site during peak construction. Emissions from worker vehicles commuting to the project site are included in the URBEMIS model used to make the estimates provided above in **Table 4.3-5**.

Well Drilling and Testing Emissions

The geothermal production and injection wells and the cooling tower blowdown/condensate/aerated brine injection well would be drilled by a contractor using a drilling rig powered by diesel engines registered as using best available control technology through portable equipment permits issued by CARB. Any rig engines used on-site for drilling each well not registered with CARB would be listed on a separate stationary source air permit issued to the drilling company by ICAPCD (EMA 2010, p. 7).

Some hydrogen sulfide would be emitted to the atmosphere if the wells are flow tested once drilling is complete. The amount of hydrogen sulfide emitted to the air would be small, because a well flow test is short in duration (EMA 2010, p. 7). Assuming that the geothermal fluid contains 70 ppm of hydrogen sulfide and that all of the hydrogen sulfide in the geothermal fluid is released to the atmosphere upon flashing (the change of fluid into steam), a well flow test conducted at rate of 500,000 pounds per hour would emit hydrogen sulfide at a rate of about 35 pounds per hour (EMA 2010, p. 7). Only one well is typically flow tested at a time (Thomas 2010).

Typically, only one well is drilled at a time in a geothermal wellfield. A reasonable estimate for the maximum number of wells that could be drilled as a result of the project is one per month due to the time needed to mobilize and demobilize the necessary well-drilling equipment (Thomas 2010). At a rate of one well drilled per month, the project would drill all of the proposed wells in approximately three years. However, such a rate of well drilling is not expected, as many of the proposed wells are projected to be replacement wells as needed over the life span of the project (Thomas 2010). A negligible to the point of unquantifiable amount of hydrogen sulfide would be released from the circulating drilling fluid during drilling activities (Thomas 2010).

Well site construction and drilling and well testing activities would generate a small number of daily one-way vehicle trips (as many as 40 or more trucks and 12–16 small trucks/service vehicles/worker vehicles on peak days). These vehicles will release fuel combustion emissions during the well drilling and testing operations. About 50–60 workers would commute to the project during well site construction, but these operations would be short term and temporary. Truck, service vehicle, and worker vehicle traffic during project operations would be substantially smaller. The air pollutant emissions from these small numbers of vehicles would have a negligible impact on air quality in Imperial County.

Construction of the proposed project would result in short-term emissions of criteria air pollutants from construction equipment operation and soil disturbances, but would not violate or significantly contribute to an existing violation of one or more air quality standards. This impact

would therefore be **less than significant with mitigation**. In concurrence with ICAPCD recommendations, the following mitigation is required.

Mitigation Measures

MM 4.3.2a The following fugitive PM₁₀ control measures shall be implemented where feasible, in addition to the requirements of ICAPCD Regulation VIII, at the project site during all construction activities:

- a. Water exposed soil with adequate frequency for continued moist soil.
- b. Replace ground cover in disturbed areas as quickly as possible.
- c. Install automatic sprinkler system on all soil piles.
- d. Limit vehicle speed for all construction vehicles to a maximum of 15 mph on any unpaved surface at the construction site.
- e. Develop a trip reduction plan to achieve a 1.5 average vehicle ridership (AVR) for construction employees

Timing/Implementation: Mitigation shall be implemented throughout project construction phase

Enforcement/Monitoring: Imperial County Planning and Development Services Department

MM 4.3.2b The following construction equipment control measures shall be implemented at the project site during all construction activities, when feasible:

- a. Use alternative-fueled or catalyst-equipped diesel construction equipment, including all off-road and portable diesel-powered equipment.
- b. Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes at a maximum.
- c. Limit, to the extent feasible, the hours of operation of heavy-duty equipment and/or the amount of equipment in use.
- d. Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set).

Timing/Implementation: Mitigation shall be implemented throughout project construction phase

Enforcement/Monitoring: Imperial County Planning and Development Services Department

Implementation of mitigation measures **MM 4.3.2a** and **MM 4.3.2b** would minimize criteria air pollutants during the project's construction phase and would reduce this impact to a **less than significant** level.

4.3 AIR QUALITY

Violate Air Quality Standards Due to Long-Term Operational Emissions of Criteria Air Pollutants

Impact 4.3.3 Operation of the proposed project would result in long-term emissions of criteria air pollutants from mobile and area sources that could violate or substantially contribute to an existing violation of one or more air quality standards. This impact is **less than significant with mitigation**.

Power Generation Operations Emissions

Power generation operations would create potential sources of noncondensable gas (NCG) emissions, cooling tower particulate emissions, intermittent diesel fuel combustion emissions, and fugitive emissions of the volatile motive fluid (isopentane) (EMA 2010, p. 7). A discussion of these emissions is provided in detail below.

Geothermal Noncondensable Gas Emissions

Under assumed operating conditions, almost all of the NCGs in the geothermal fluid would be separated from the produced geothermal fluid at the respective production well sites and transported via the NCG pipeline system to the injection wells (EMA 2010, p. 7). There, the separated NCGs would be intermingled with the geothermal injection fluid and injected back into the subsurface geothermal reservoir with no air emissions (EMA 2010, p. 7). However, if very high concentrations of NCGs are encountered in the new geothermal production wells, then up to 25 percent of the NCGs produced from the geothermal fluid would be routed to the power plant site for abatement of certain air pollutants. The NCGs would be separated from the geothermal fluid in the well pad high-pressure separators and directed to the emission abatement equipment (discussed below) on the power plant site (EMA 2010, p. 7).

Other Facility Emission Sources

Air pollutants from the other identified power generation facility emission sources would include (a) NCG air pollutants from the sand separators at the production well sites; (b) NCG air pollutants from the pipeline condensate drains; (c) PM₁₀ emissions from the two cooling towers; (d) diesel combustion emissions from the standby diesel engine-generator and the diesel fire pump engine; and (e) fugitive emissions of isopentane from the Ormatt Energy Converter (OEC) units. Isopentane is an organic compound with a variety of uses, ranging from an ingredient in cosmetics to a component in geothermal power plants. This solvent is extremely flammable. Its tendency to evaporate makes it useful for dissolving compounds, since it is easily evaporated away. Isopentane smells like gasoline and does not dissolve in water, but floats on top of it. Isopentane is used in geothermal plant processes as geothermal plants tap into heat energy deep in the earth and convert it to electricity. Hot water from the geothermal energy heats liquid isopentane and turns it into a gas. This gas then drives a turbine and generator to generate the power plant's electricity.

Fugitive Isopentane Emissions

Each OEC unit would have minute leaks of the motive fluid (isopentane) from valves, connections, seals, and tubes, which would be released either to the atmosphere or into the geothermal fluid or circulating cooling water lines. Isopentane would also be discharged to the atmosphere from OEC unit vapor recovery units (through which air leaked into the isopentane condensers is discharged to recover isopentane vapors) and during OEC unit maintenance activities. The annual fugitive emissions of isopentane from the project without mitigation are

estimated at about 25 tons (Table 4.3-6) based on inventory losses at similar facilities. Isopentane is a reactive organic compound (ROC) as defined by ICAPCD.

The projected air pollutant emissions without mitigation from each of the power generation air pollutant emission sources are summarized in Table 4.3-6.

Wastewater Treatment Plant Upgrades

No criteria air pollutants emissions would result from the proposed tertiary treatment of wastewater as a source of power plant cooling water (EMA 2010, p. 10). Tertiary treatment would occur at new treatment facilities constructed within the footprint of an existing wastewater treatment pond at the neighboring Brawley wastewater treatment plant (see Appendix C). The tertiary treatment would be predominantly physical processes including mixing and flocculation of solids, sediment removal, filtration, and ultraviolet (UV) disinfection. Under normal operations a light dosage of sodium hypochlorite would be injected into the effluent pump to maintain residual disinfectant. Sodium hypochlorite is a chemical compound containing chlorine in an oxidated state, meaning that it has lost electrons. Sodium hypochlorite is a liquid chemical compound normally used for cleaning and purification. When in a solution, it is commonly known as chlorine bleach. This chemical compound can be dangerous if swallowed.

**TABLE 4.3-6
SUMMARY OF PROJECTED POWER GENERATION AIR POLLUTANT
EMISSIONS BEFORE ABATEMENT BY EMISSION SOURCE (TONS PER YEAR)**

Emission Source	PM ₁₀	SO ₂	CO	NO _x	ROC ¹	H ₂ S	NH ₃	C ₆ H ₆ ¹
	Tons per Year							
High Pressure Separator	0.00	0.00	0.00	0.00	48.87	12.79	1.53	48.87
RTO Unit/Scrubber NCG Abatement System Emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sand Separators NCG Emissions	0.00	0.00	0.00	0.00	2.27	0.45	57.13	2.27
Injection Filters NCG Emissions	0.00	0.00	0.00	0.00	0.05	0.01	1.32	0.05
NCG Pipeline Condensate Drains Emissions	0.00	0.00	0.00	0.00	0.003	0.0007	0.08	0.003
North Cooling Tower Emissions	11.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
South Cooling Tower Emissions	11.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	0.00	0.00	24.82	0.00	0.00	0.00
Emergency Standby Diesel Fire-Water Pump Engine	0.0011	0.0001	0.0071	0.06	0.0017	0.00	0.00	0.00
Emergency Standby	0.0059	0.0002	0.103	0.11	0.003	0.00	0.00	0.00

4.3 AIR QUALITY

Emission Source	PM ₁₀	SO ₂	CO	NO _x	ROC ¹	H ₂ S	NH ₃	C ₆ H ₆ ¹
	Tons per Year							
Diesel Generator Engine								
Total	22.63	0.00	0.10	0.17	76.02	13.25	60.08	51.20
ICAPCD Rule 207.C.2.a Significance Threshold	25	25	25	25	25	--	--	--
Significant	No	No	No	No	Yes	No	No	No

¹ ROC – reactive organic compound, H₂S – hydrogen sulfide, NH₃ – ammonia, C₆H₆ – benzene. Benzene is also listed as a ROC.

Source: EMA 2010, Appendix B

Projects that have the potential to emit regulated air pollutants must comply with ICAPCD and EPA rules and regulations. New Source Review (ICAPCD Rule 207) requires that any new or modified air pollution emission unit emitting any nonattainment air pollutant or its precursors in excess of 25 pounds per day, or 55 pounds per day of H₂S, must utilize best available control technology (BACT). The north and south cooling towers of the proposed project have the potential to emit more than 25 pounds per day of PM₁₀ and will require BACT in the form of high-efficiency drift eliminators (EMA 2010, p. 11). In addition, the wellhead high-pressure separators have the potential to emit reactive organic compounds from the geothermal NCG in excess of 25 pounds per day. A regenerative thermal oxidizer unit and caustic scrubber abatement system, described below, is considered BACT for these emissions. Lastly, each OEC unit also has the potential to emit more than 25 pounds per day of fugitive ROC (isopentane) emissions; BACT, in the form of inspection, monitoring, and use of a maintenance vapor recovery unit, would limit these emissions (EMA 2010, p. 11).

Regenerative Thermal Oxidizer Unit/Caustic Scrubber Abatement System

A regenerative thermal oxidizer (RTO) unit and caustic scrubber system is proposed to be used to abate the combustible NCG air pollutant emissions. The RTO unit would remove by thermal oxidation essentially all of the ammonia and a minimum of 98 percent of the methane (CH₄), benzene (C₆H₆), and hydrogen sulfide (H₂S) in the geothermal NCG delivered to the RTO unit (EMA 2010, p. 7). The oxidization of H₂S by the RTO unit would produce sulfur dioxide (SO₂), and the oxidization of ammonia by the RTO unit would produce oxides of nitrogen (NO_x). About 97.5 percent of the SO₂ created in the RTO unit would be removed by the caustic scrubber (EMA 2010, p. 8). Some PM₁₀ emissions would be generated from the scrubber, resulting from the dissolved solids in the caustic scrubbing liquid which would be entrained in the gases emitted from the scrubber stack. The RTO/scrubber system represents BACT for removal of the H₂S and C₆H₆ in the NCG. The projected air pollutant emissions with implementation of the RTO unit and scrubber system from each of the power generation air pollutant emission sources, as well as daily emissions from the RTO/scrubber itself, including both the NCG and the RTO combustion emissions are summarized below in **Table 4.3-7**.

**TABLE 4.3-7
SUMMARY OF PROJECTED POWER GENERATION AIR POLLUTANT
EMISSIONS AFTER ABATEMENT BY EMISSION SOURCE (RTO OPERATING) (TONS PER YEAR)**

Emission Source	PM ₁₀	SO ₂	CO	NO _x	ROC ¹	H ₂ S	NH ₃	C ₆ H ₆ ¹
	Tons per Year							
High Pressure Separator	0.00	0.00	0.00	0.00	1.54	0.40	0.05	1.54
RTO Unit/Scrubber NCG Abatement System Emissions	2.12	0.57	0.00	4.02	0.95	0.25	0.00	0.95
Sand Separators NCG Emissions	0.00	0.00	0.00	0.00	2.27	0.45	57.14	2.24
Injection Filters NCG Emissions	0.00	0.00	0.00	0.00	0.05	0.01	1.32	0.05
NCG Pipeline Condensate Drains Emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
North Cooling Tower Emissions	11.32	0.00	0.0	0.00	0.00	0.00	0.00	0.00
South Cooling Tower Emissions	11.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	0.00	0.00	24.82	0.00	0.00	0.00
Emergency Standby Diesel Fire-Water Pump Engine	0.00	0.00	0.01	0.06	0.00	0.00	0.00	0.00
Emergency Standby Diesel Generator Engine	0.01	0.00	0.10	0.11	0.00	0.00	0.00	0.00
Total	24.76	0.57	0.11	4.20	29.64	1.11	58.60	4.82
ICAPCD Rule 207.C.2.a Significance Threshold	25	25	25	25	25	--	--	--
Significant	No	No	No	No	Yes	No	No	No

¹ ROC – reactive organic compound, H₂S – hydrogen sulfide, NH₃ – ammonia, C₆H₆ – benzene. Benzene is also listed as a ROC.

Source: EMA 2010, p. 9

ICAPCD Rule 207.C.2.a requires offsets for facility emissions of each regulated air pollutant in excess of 137 pounds per day. As seen in **Table 4.3-7**, even with implementation of the RTO unit and scrubber system, the power plant would emit 29.64 tons per year (161 pounds per day) of ROCs, which is in excess of 137 pounds per day, so offsets would be required for these excess project emissions at a rate of 1.2 to 1.0. ICAPCD maintains a list of entities that own eligible ROC emission offset credits. Upon issuance of the Authority to Construct for the project from ICAPCD, the proposed project would contact and purchase the necessary ROC emission offset credits from one or more of these entities. The acquisition of offset credits will not be made until the plant is under construction. Implementation of the offset mitigation would reduce the net emissions of ROCs in the Salton Sea Air Basin, because of the 1.2/1.0 offsets.

4.3 AIR QUALITY

As discussed above, the proposed project would need to comply with ICAPCD Rule 207 by utilizing the appropriate BACTs with specific emitting sources in order to mitigate emissions from these sources of the proposed project. In addition, the proposed project will need to fulfill its obligations mandated in ICAPCD Rule 207.C.2.a in order to mitigate project air pollutants associated with ozone or PM₁₀ in excess of 137 pounds per day, which involves the purchase of necessary ROC emission offset credits from one or more entities. Implementation of the appropriate BACTs and the offset mitigation would reduce the net emissions of ROCs in the Salton Sea Air Basin (EMA 2010, p. 12) to **less than significant with mitigation**.

Mitigation Measures

MM 4.3.3a The proposed project shall be required to implement the use of a regenerative thermal oxidizer (RTO) unit and caustic scrubber system, which shall be used to abate the combustible noncondensable gas air pollutant emissions, during project operations. The RTO/scrubber system represents best available control technology for removal of H₂S and C₆H₆ in the noncondensable gas. In addition, the proposed project shall be required to implement the use of a maintenance vapor recovery unit to limit OEC unit emissions as well as high-efficiency drift eliminators to abate PM₁₀ emissions from the north and south cooling towers.

Timing/Implementation: Ongoing

Enforcement/Monitoring: Imperial County Planning and Development Services Department in coordination with the Imperial County Air Pollution Control District

MM 4.3.3b The proposed project shall be required to fulfill its obligations mandated in Imperial County Air Pollution Control District Rule 207.C.2.a in order to mitigate project air pollutants associated with ozone or PM₁₀ in excess of 137 pounds per day with the purchase of necessary ROC emission offset credits from one or more entities prior to the issuance of construction permits.

Timing/Implementation: Prior to the issuance of grading permits

Enforcement/Monitoring: Imperial County Planning and Development Services Department in coordination with the Imperial County Air Pollution Control District

Implementation of mitigation measures **MM 4.3.3a** and **MM 4.3.3b** would ensure compliance with ICAPCD Rule 207 requiring utilization of the appropriate BACTs with specific emitting sources (RTO/scrubber abatement system) as well as with ICAPCD Rule 207.C.2.a, which involves the purchase of necessary ROC emission offset credits from one or more entities. This impact would be **less than significant**.

Violate Air Quality Standard for Near-Term Local Mobile-Source Carbon Monoxide

Impact 4.3.4 Implementation of the proposed project would not be anticipated to contribute to localized concentrations of mobile-source CO that would exceed applicable ambient air quality standards. This impact is considered **less than significant**.

A carbon monoxide hot spot is a localized concentration of carbon monoxide that is above state and/or federal 1-hour or 8-hour ambient air standards and is generally associated with idling or slow-moving traffic. Based on ICAPCD guidance, the proposed project can be said to have no potential to create a violation of the CO standard if neither of the following criteria are met:

- A traffic study for the proposed project indicates that the levels of service (LOS) on one or more streets or at one or more intersections in the project vicinity will be reduced to LOS E or F; or
- A traffic study indicates that the proposed project will substantially worsen an already existing LOS F on one or more streets or at one or more intersections in the project vicinity.

According to data provided in the traffic study (see **Appendix N**), the proposed East Brawley Geothermal Development project is estimated to generate 84 daily vehicles. The surrounding study area intersections are each operating at an acceptable LOS A in the AM and PM peak periods, and with the addition of the project, the surrounding roadways and intersections will continue to operate at LOS A (Darnell & Associates 2009).

Since significant impacts would not occur at the surrounding intersections, no significant impacts are anticipated to occur in the project vicinity. Consequently, sensitive receptors would not be significantly affected by localized CO emissions generated by project-related traffic. Therefore, this impact is **less than significant**.

Mitigation Measures

None required.

Exposure of Public to Hazardous Air Pollutants

Impact 4.3.5 Project operations will result in low levels of hazardous air pollutant emissions in the vicinity of the project site. This impact is **potentially significant**.

Hazardous Air Pollutants

Benzene (C₆H₆) is considered a federal hazardous air pollutant (HAP) due to its toxicity and it is also considered a ROC by ICAPCD. A low concentration of C₆H₆ occurs naturally in the geothermal NCG and has the potential to be emitted from the project NCG emission sources. Other federal HAP emissions from the project would be those emissions associated with the intermittent combustion of diesel fuel by the standby emergency diesel generator and emergency fire pump diesel engine. Mitigation measure **MM 4.3.3a**, above, would require the implementation of a RTO/scrubber system, which represents BACT for removal of C₆H₆ in the noncondensable gas emissions. A summary of the HAP emissions from the project operations before factoring the emissions reductions resulting from mitigation measure **MM 4.3.3a** is provided in **Table 4.3-8**, while HAP emissions from the project operations after **MM 4.3.3a** are identified in **Table 4.3-9**.

4.3 AIR QUALITY

**TABLE 4.3-8
HAZARDOUS AIR POLLUTANT EMISSIONS BEFORE ABATEMENT (MM 4.3.3A)**

Emission Source	Hazardous Air Pollutant Emission (tons/year)		
	Diesel HAPs	C ₆ H ₆	Totals
High Pressure Separator Emissions	0.00000	48.8754	48.8754
RTO Unit/Scrubber NCG Abatement System Emissions	0.00000	0.0000	0.94671
Sand Separators NCG Emissions	0.0000	2.27388	2.27388
Injection Filters NCG Emissions	0.0000	0.05273	0.05273
NCG Pipeline Condensate Drains Emissions	0.00000	0.00356	0.00356
North Cooling Tower	0.00000	0.00000	0.00000
South Cooling Tower	0.00000	0.00000	0.00000
OEC Isopentane Emissions	0.00000	0.00000	0.00000
Emergency Standby Diesel Fire-Water Pump	0.00184	0.00000	0.00184
Emergency Standby Diesel Generator	0.01015	0.00000	0.01015
Totals	0.01199	51.2056	52.1642

Source: EMA 2010, Appendix B

**TABLE 4.3-9
HAZARDOUS AIR POLLUTANT EMISSIONS AFTER ABATEMENT (MM 4.3.3A)**

Emission Source	Hazardous Air Pollutant Emission (tons/year)		
	Diesel HAPs	C ₆ H ₆	Totals
High Pressure Separator Emissions	0.00000	1.53991	1.53991
RTO Unit/Scrubber NCG Abatement System Emissions	0.00000	0.94671	0.94671
Sand Separators NCG Emissions	0.0000	2.27388	2.27388
Injection Filters NCG Emissions	0.0000	0.05273	0.05273
NCG Pipeline Condensate Drains Emissions	0.00000	0.00356	0.00356
North Cooling Tower	0.00000	0.00000	0.00000
South Cooling Tower	0.00000	0.00000	0.00000
OEC Isopentane Emissions	0.00000	0.00000	0.00000
Emergency Standby Diesel Fire-Water Pump	0.00184	0.00000	0.00184
Emergency Standby Diesel Generator	0.01015	0.00000	0.01015
Totals	0.01199	4.81678	4.82877

Source: EMA 2010, p. 10

Air quality modeling conducted (see **Appendix D**) for the project projected the long-term average C₆H₆ stack emissions from the power plant. These emissions were used to model the potential health hazard from the project at residences and other industrial and commercial facilities within 1 mile of the power plant site. The health risk assessment determined that the residential receptor with the highest modeled, 5-year average, annual C₆H₆ concentration

would have a projected cancer risk factor of 7.52×10^{-7} , and this same residential receptor would have an inhalation cancer potency risk factor of 9.77×10^{-7} , each of which is below the generally accepted *de minimus* project cancer risk of one in one million.¹

Major Stationary Source

Major stationary sources are subject to the requirements of Title V of the federal Clean Air Act Amendments of 1990. ICAPCD District Rule 900.B20 defines a “major source” as a stationary source which has the potential to emit either a regulated air pollutant in quantities equal to or exceeding 100 tons per year or a single HAP in quantities equal to or exceeding 10 tons per year, or any lesser quantity threshold promulgated by the EPA. The project would not emit more than 100 tons per year of any regulated air pollutant. However, without the proposed RTO/scrubber emission abatement, the project has the potential to emit more than 10 tons per year of the HAP benzene, and pursuant to Rule 900 of ICAPCD, the project would be considered a major stationary source unless the abatement of the benzene is federally enforceable. Thus the requirement of mitigation measure **MM 4.3.3a** above, which mandates the implementation of a regenerative thermal oxidizer (RTO) unit and caustic scrubber system as well as a maintenance vapor recovery unit to limit OEC unit emissions and high-efficiency drift eliminators to abate PM₁₀ emissions from the north and south cooling towers, as part of the proposed project.

Under ICAPCD Rule 902, the owners or operators of a stationary source that would otherwise be a major source (pursuant to Rule 900) may request and accept federally enforceable emission limits to become a “synthetic” minor source, thereby avoiding Title V requirements. As part of a pending revised air permit application, the project applicant is submitting a request for synthetic minor source status because the proposed RTO unit/caustic scrubber system would reduce the facility’s emissions of C₆H₆ to under the 10 tons per year threshold (see **Table 4.3-7**). Under synthetic minor source status, the project would not be a major source and would not be subject to ICAPCD Rule 900. However, until the pending air permit application requesting for synthetic minor source status is approved, this impact would be considered **potentially significant**.

Mitigation Measures

MM 4.3.5 The proposed project shall achieve synthetic minor source status in order to mitigate project air pollutants associated with the HAP benzene (C₆H₆) prior to the issuance of construction permits.

Timing/Implementation: Prior to the issuance of construction permits

Enforcement/Monitoring: Imperial County Planning and Development Services Department

Because the applicant is revising their air permit application for the proposed project for a synthetic minor source status, implementation of mitigation measure **MM 4.3.5** would reduce this impact to a level that is considered **less than significant**. Because the project would be required to enforce apply the federal conditions for synthetic minor source status requiring permanent,

¹ See Assessment of Potential Health Risks from Benzene and Hydrogen Sulfide Emissions from the East Brawley Regenerative Thermal Oxidizer Unit and Caustic Scrubbing System, located in **Appendix D**.

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quantifiable, and practically enforceable permit conditions including operational limitations and conditions.

Objectionable Odors Affecting a Substantial Number of People

Impact 4.3.6 Receptors located in the vicinity of the proposed project may be exposed to small amounts of odorous emissions. This impact is considered **less than significant**.

Minimal hydrogen sulfide (H₂S) emissions would be released during operation of the project power plant, as the majority of the gas would be injected back into the geothermal reservoir via the injection or blowdown wells (EMA 2010, p. 16). Air quality modeling conducted for the project shows that power plant emissions of hydrogen sulfide from the scrubber stack would not produce hydrogen sulfide concentrations in excess of the state ambient air quality (odor) standard at any occupied residence (EMA 2010, p. 16). Hydrogen sulfide would also be emitted during well drilling and flow testing. However, the concentrations of H₂S measured in the geothermal fluids in the North Brawley geothermal area are low (EMA 2010, p. 16), and H₂S emissions during drilling and flow testing would be short term and temporary (about 20 days).

Typically, only one well is drilled at a time in a geothermal wellfield, and a reasonable estimate for the maximum number of wells that could be drilled as a result of the project is one per month due to the time needed to mobilize and demobilize the necessary well-drilling equipment (Thomas 2010). As previously mentioned, a negligible to the point of unquantifiable amount of hydrogen sulfide would be released from the circulating drilling fluid during drilling activities (Thomas 2010).

The amount of hydrogen sulfide emitted to the air during flow testing would be small, because a well flow test is short in duration (EMA 2010, p. 7). Assuming that the geothermal fluid contains 70 ppm of hydrogen sulfide and that all of the hydrogen sulfide in the geothermal fluid is released to the atmosphere upon flashing (the change of fluid into steam), a well flow test conducted at rate of 500,000 pounds per hour would emit hydrogen sulfide at a rate of about 35 pounds per hour (EMA 2010, p. 7). Only one well is typically flow tested at a time (Thomas 2010).

The tertiary treatment of wastewater includes injection of sodium hypochlorite into the effluent pump to maintain residual disinfectant. This would result in a beneficial effect of eliminating residual odor from organic wastes from the existing discharge of secondary treated wastewater into the New River. This impact is **less than significant**.

Mitigation Measures

None required.

4.3.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for air quality is the SSAB, which consists of all of Imperial County and a portion of Riverside County, including existing, approved, proposed, and reasonably foreseeable development within the air basin. Regional air quality in the SSAB is affected by topography and atmospheric inversions. The area is generally very flat and bordered to the west by the Peninsular Mountain range and to the east by the Chocolate, Orocopia, and Cargo Muchacho mountains. The prevailing winds tend to come from the west-northwest through

southwest. The mountains to the east act as physical barriers to the dispersion of airborne contaminants. At current levels of development and activity, the air basin exceeds the state and federal ambient standards for PM₁₀ and ozone. Cumulative growth in Imperial County and the SSAB would increase population, vehicle use, and industrial activity, which could inhibit efforts to improve regional air quality and attain ambient air quality standards.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Air Quality

Impact 4.3.7 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would contribute to increased air quality emissions in the air basin. This is considered a **potentially cumulatively considerable** impact.

As discussed under Impact 4.3.3, the project would result in an increase of regulated air pollutants associated with ozone or PM₁₀ in excess of 137 pounds per day. As depicted in **Table 4.2-7**, the power plant would emit 29.64 tons per year (161 pounds per day) of ROCs, which is in excess of 137 pounds per day, so offsets would be required for these excess project emissions at a rate of 1.2 to 1.0. Mitigation measure **MM 4.3.3a** mandates the implementation of a regenerative thermal oxidizer (RTO) unit and caustic scrubber system as well as a maintenance vapor recovery unit to limit OEC unit emissions as part of the proposed project. The RTO unit would remove by thermal oxidation essentially all of the ammonia and a minimum of 98 percent of the methane (CH₄), benzene (C₆H₆), and hydrogen sulfide (H₂S) in the geothermal NCG delivered to the RTO unit (EMA 2010, p. 7). Mitigation measure **MM 4.3.3b** requires the proposed project to fulfill its obligations mandated in ICAPCD Rule 207.C.2.a in order to mitigate project air pollutants associated with ozone or PM₁₀ in excess of 137 pounds per day with the purchase of necessary ROC emission offset credits from one or more entities. Implementation of mitigation measure **MM 4.3.3b** would reduce the net emissions of ROCs in the Salton Sea Air Basin (EMA 2010, p. 12).

As discussed under Impact 4.3.5, without the proposed RTO/scrubber emission abatement, the proposed project has the potential to emit more than 10 tons per year of the HAP benzene. Pursuant to Rule 900 of ICAPCD, the project would be considered a major stationary source unless the abatement of benzene is federally enforceable. This impact would be **less than cumulatively considerable with mitigation**.

Mitigation Measures

No additional mitigation is required. Implementation of mitigation measure **MM 4.3.5** mandates the achievement of synthetic minor source status in order to mitigate project air pollutants associated with benzene (prior to the issuance of construction permits). Therefore, the proposed project's cumulative impact to air quality from operational emissions is considered **less than cumulatively considerable**.

4.3 AIR QUALITY

REFERENCES

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4.3 AIR QUALITY

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) for the proposed East Brawley Geothermal Development project analyzes the potential impacts on air quality resulting from the proposed project. The air quality impact analysis (see **Appendix D**) was prepared by Environmental Management Associates, Inc. (2010) using methodologies and assumptions recommended within the various guidelines of the Imperial County Air Pollution Control District (ICAPCD). Regional and local air quality conditions are presented, along with pertinent air quality standards and regulations. Mitigation measures are recommended, as necessary, to reduce significant air quality impacts. An analysis of the proposed project's individual and cumulative contribution to climate change is provided in Section 4.14 of this Draft EIR.

4.3.1 EXISTING SETTING

AIR POLLUTION CLIMATOLOGY

The entire Imperial County, including the project site, lies within the Salton Sea Air Basin (SSAB), which is under the jurisdiction of ICAPCD. The SSAB consists of all of Imperial County and the southeast portion of Riverside County.

The SSAB is generally an arid desert region, with a significant portion located below sea level. A semi-permanent high-pressure cell blocks mid-latitude storms and causes sunny skies most of the time. The high-pressure zone tends to be weaker in the winter and it is during this time that the SSAB usually receives its average 2.8 inches of yearly precipitation. The wettest month in the SSAB is December, averaging 0.5 inches of rainfall, while the driest month is June, with measurable rainfall recorded only twice since 1914. Rainfall is highly variable, with precipitation from a single heavy storm event one year exceeding the entire annual total during a drought year. Average humidity can range from 28 percent in summer to 52 percent in winter. A large daily oscillation of temperature produces a corresponding large variation in the relative humidity (Imperial County 1993).

These climatic conditions are strongly influenced by the large-scale sinking and warming of air in the semi-permanent subtropical high-pressure center of the Pacific Ocean. The Peninsular Mountain range to the west blocks any coastal influence, such as cool and damp marine air. The geographic barriers and atmospheric conditions limit precipitation in the area. The flat terrain of the SSAB and the strong temperature differentials created by intense solar heating produce moderate winds and deep thermal convection. The combination of subsiding air, protective mountains, and distance from the ocean all combine to severely limit precipitation. As a result, the climate of the Imperial Valley is arid, with hot summers and mild winters. Temperatures exceed 100 degrees for more than 110 days out of the year, and there are more than 300 frost-free days per year. While summers are intensely hot, the climate for the rest of the year is mild.

Wind in the project area blows from west to east most of the time and high winds are occasionally experienced in the SSAB. Wind speeds in excess of 30 miles per hour occur most frequently in April and May. On an annual basis, strong winds (greater than 30 miles per hour) are observed 0.6 percent of the time; speeds of less than 6.8 miles per hour account for more than one-half of the observed winds (Imperial County 1993).

Regional air quality within the SSAB is affected by topography and atmospheric inversions. The area is generally very flat and bordered to the west by the Peninsular Mountain range and to the east by the Chocolate, Orocopia, and Cargo Muchacho mountains. The prevailing winds tend to come from the west-northwest through southwest. The mountains to the east act as physical barriers to the dispersion of airborne contaminants.

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The SSAB also experiences surface inversions almost every day of the year. These inversions are caused by the presence of the region's typical subtropical high-pressure cell, which causes the air mass aloft to sink. Air masses are large bodies of air with similar temperature and moisture content. An air mass aloft refers to the higher-altitude air mass which inductively suggests that there is a separate (and thus different in temperature and moisture content) air mass at ground level. As this air mass sinks, the temperature thereof rises through compressional heating, thus exceeding the temperature of the air below. This stable atmospheric condition, known as a subsidence inversion, becomes a nearly impenetrable barrier to the vertical mixing of pollutants. These inversions often last for long periods of time, which allows for air stagnation and the buildup of pollutants. During the winter, the area experiences radiation inversions in which the air near the ground surface cools by radiation, whereas the air higher in the atmosphere remains warmer. A shallow inversion layer is created between the two layers and precludes the vertical dispersion of air, thus trapping pollutants. Highest ozone levels are often associated with subsidence inversions.

AIR POLLUTANT PROPERTIES, EFFECTS, AND SOURCES

The following section describes the pollutants of greatest importance in Imperial County. It provides a description of the physical properties, the health effects and other effects of the pollutant, and the sources of the pollutant.

Ozone

Ozone (O₃) is what is known as a photochemical pollutant. It is not emitted directly into the atmosphere, but is formed by a complex series of chemical reactions between reactive organic gases (ROG), nitrogen oxide (NO_x), and sunlight. ROG and NO_x are emitted from automobiles, solvents, and fuel combustion, the sources of which are widespread throughout Imperial County. In order to reduce ozone concentrations, it is necessary to control the emissions of these ozone precursors. Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight. Ozone is a regional air pollutant. It is generated over a large area and is transported and spread by wind.

While ozone in the upper atmosphere protects the earth from harmful ultraviolet radiation, high concentrations of ground-level ozone can adversely affect the human respiratory system. Many respiratory ailments, as well as cardiovascular disease, are aggravated by exposure to high ozone levels. Ozone also damages natural ecosystems, such as forests and foothill communities, and damages agricultural crops and some man-made materials, such as rubber, paint, and plastics.

Particulate Matter

Suspended particulate matter (airborne dust) consists of particles small enough to remain suspended in the air for long periods. Respirable particulate matter (PM₁₀ and PM_{2.5}) includes particulates which are small enough to be inhaled, pass through the respiratory system, and lodge in the lungs, with resultant health effects. PM₁₀ consists of particulate matter that is 10 microns or less in diameter, and PM_{2.5} consists of particulate matter of 2.5 microns or less in size. PM₁₀ and PM_{2.5} comprise dust, sand, salt spray, metallic and mineral particles, pollen, smoke, mist, and acid fumes. Also of importance are sulfate (SO₄) and nitrates (NO₃), which are secondary particles formed as precipitates from photochemical reactions of gaseous sulfur dioxide (SO₂) and NO_x in the atmosphere. The actual composition of PM₁₀ and PM_{2.5} varies greatly with time and location depending on the sources of the material and meteorological conditions.

Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis, and respiratory illnesses in children. Recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non-health-related effects include reduced visibility and soiling of buildings.

Generally speaking, PM_{2.5} sources tend to be combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM₁₀ sources include these same sources plus roads and farming activities. Fugitive windblown dust and other area sources also represent sources of airborne dust in the SSAB.

Reactive Organic Gases

Reactive organic gases (ROG), also known as volatile organic compounds, are photochemically reactive hydrocarbons that are important for ozone formation. This definition excludes methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonates, methylene chloride, methyl chloroform, and various chlorofluorocarbons. There are no health standards for ROG separately. The main concern with ROG is its role in photochemical ozone formation. In addition, some compounds that make up ROG are also toxic. An example is benzene, which is a carcinogen.

The primary sources of ROG are mobile sources, solvents, farming operations and other area sources, and oil and gas production.

Nitrogen Oxides

Nitrogen oxides (NO_x) are a family of gaseous nitrogen compounds and are precursors to ozone formation. The major component of NO_x, nitrogen dioxide (NO₂), is a reddish-brown gas that is toxic at high concentrations. NO_x results primarily from the combustion of fossil fuels under high temperature and pressure.

Health effects associated with NO_x are an increase in the incidence of chronic bronchitis and lung irritation. Chronic exposure to NO₂ may lead to eye and mucous membrane aggravation, along with pulmonary dysfunction. NO_x can cause fading of textile dyes and additives, deterioration of cotton and nylon, and corrosion of metals due to production of particulate nitrates. Airborne NO_x can also impair visibility. NO_x is a major component of acid disposition in California. On-road and off-road motor vehicles and fuel combustion are the major sources of this air pollutant.

Carbon Monoxide

Carbon monoxide (CO) is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels and is emitted directly into the air (unlike ozone). Under most conditions, CO does not persist in the atmosphere and is rapidly dispersed. CO exceedances are most likely to occur in the winter, when relatively low inversion levels trap pollutants near the ground and concentrate the CO. Automobiles are the major source of CO in the Imperial Valley, although various industrial processes also emit CO through incomplete combustion of fuels. In high concentrations, CO can cause serious health problems in humans by limiting the red blood cells' ability to carry oxygen.

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Other Pollutants

Sulfur Dioxide

Sulfur dioxide (SO₂) is a colorless, irritating gas with a rotten egg smell formed primarily by the combustion of sulfur-containing fuels such as coal, fuel oil, and diesel fuels. Health effects include sore throats, coughing, and breathing problems. In addition, like nitrogen dioxide, sulfur dioxide changes in the atmosphere to acidic particles and sulfuric acid, which can injure both people and plants. It is rare in California to see levels of SO₂ high enough to cause these symptoms.

Lead

Lead is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. Lead was used until recently to increase the octane rating in auto fuel. Since gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels and the use of leaded fuel has been mostly phased out, the ambient concentrations of lead have dropped dramatically.

Hydrogen Sulfide

Hydrogen sulfide (H₂S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. The California ambient air quality standard for H₂S is 0.030 parts per million (ppm) for 1 hour. Hydrogen sulfide is extremely hazardous in high concentrations (800 ppm can cause death), especially in enclosed spaces. The Occupational Safety and Health Administration (OSHA) regulates workplace exposure to H₂S. The entire SSAB is unclassified for hydrogen sulfide attainment.

Odors

Odors are typically regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. It is also important to note that an unfamiliar odor is more easily detected and is more

likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

AIR QUALITY DESIGNATIONS AND CLASSIFICATIONS

Areas with air quality that exceed adopted air quality standards are designated as nonattainment areas for the relevant air pollutants. Nonattainment areas are sometimes further classified by degree (marginal, moderate, serious, severe, and extreme for ozone, and moderate and serious for carbon monoxide and PM₁₀) or status (nonattainment-transitional). Areas that comply with air quality standards are designated as attainment areas for the relevant air pollutants. Unclassified areas are those with insufficient air quality monitoring data to support a designation of attainment or nonattainment, but are generally presumed to comply with the ambient air quality standard. State Implementation Plans must be prepared by states for areas designated as federal nonattainment areas to demonstrate how the area will come into attainment of the exceeded federal ambient air quality standard.

As detailed in the Regulatory Framework discussion below, both the California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (EPA) have established air pollution standards in an effort to protect human health and welfare. Geographic areas are designated attainment if these standards are met and nonattainment if they are not met. In addition, each agency has several levels of classifications based on severity of the problem. For example, the SSAB is classified a serious nonattainment area for 24-hour particulate matter equal to or less than 10 microns in aerodynamic diameter (PM₁₀), a nonattainment area for particulate matter equal to or less than 2.5 microns in aerodynamic diameter (PM_{2.5}), and a moderate 8-hour ozone (O₃) nonattainment area, and it is an unclassified or attainment area for all other criteria air pollutants, as summarized in **Table 4.3-1**.

**TABLE 4.3-1
AIR QUALITY STANDARD ATTAINMENT STATUS – SALTON SEA AIR BASIN**

Pollutant	Designation/Classification	
	State	Federal
Ozone – 1-hour standard	Nonattainment	Revoked June 2005 ¹
Ozone – 8-hour standard	Nonattainment	Nonattainment – Moderate
PM ₁₀	Nonattainment	Nonattainment – Serious
PM _{2.5}	Unclassified	Nonattainment
CO	Attainment	Unclassified/Attainment
NO ₂	Attainment	Unclassified/Attainment
SO ₂	Attainment	Attainment
Lead (Particulate)	Attainment	No Designation/Classification
All Others	Attainment/Unclassified	No Federal Standard

Source: EMA 2010, p. 5

¹ Effective June 15, 2005, EPA revoked the federal 1-hour ozone standard, including associated designations and classifications.

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4.3.2 REGULATORY FRAMEWORK

AMBIENT AIR QUALITY STANDARDS

Both the EPA and CARB have established ambient air quality standards for common pollutants. These ambient air quality standards are levels of contaminants that represent safe levels which avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover criteria pollutants.

The federal and California ambient air quality standards are summarized in **Table 4.3-2** for important pollutants. The federal and state ambient standards were developed independently with differing purposes and methods, although both processes attempted to avoid health-related effects. As a result, the federal and state standards differ in some cases. In general, the California standards are more stringent. This is particularly true for ozone and particulate matter, which are the most problematic pollutants in Imperial County.

**TABLE 4.3-2
SUMMARY OF AMBIENT AIR QUALITY STANDARDS**

Pollutant	Averaging Time	California Standards ^(a, c)	National Standards ^(b, c)	
			Primary ^(d)	Secondary ^(e)
Ozone (O ₃)	1-hour	0.09 ppm (180 µg/m ³)	–	Same as Primary
	8-hour	0.070 ppm (137 µg/m ³)	0.075 ppm (147 µg/m ³)	
Particulate Matter (PM ₁₀)	AAM	20 µg/m ³	–	
	24-hour	50 µg/m ³	150 µg/m ³	
Fine Particulate Matter (PM _{2.5})	AAM	12 µg/m ³	15.0 µg/m ³	
	24-hour	No Standard	35 µg/m ³ (f)	
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	None
	8-hour	9 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	
	8-hour (Lake Tahoe)	6 ppm (7 mg/m ³)	–	
Nitrogen Dioxide (NO ₂)	AAM	0.030 ppm (56 µg/m ³)	0.053 ppm (100 µg/m ³)	Same as Primary
	1-hour	0.18 ppm (338 µg/m ³)	0.100 ppm	None
Sulfur Dioxide (SO ₂)	AAM	–	0.03 ppm (80 µg/m ³)	–
	24-hour	0.04 ppm (105 µg/m ³)	0.14 ppm (365 µg/m ³)	–
	3-hour	–	–	0.5 ppm (1,300 µg/m ³)
	1-hour	0.25 ppm (655 µg/m ³)	75 ppb	–

Pollutant	Averaging Time	California Standards ^(a, c)	National Standards ^(b, c)	
			Primary ^(d)	Secondary ^(e)
Lead	30-day Average	1.5 µg/m ³	–	–
	Calendar Quarter	–	1.5 µg/m ³	Same as Primary
Sulfates	24-hour	25 µg/m ³	No Federal Standards	
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m ³)		
Vinyl Chloride	24-hour	0.01 ppm (26 µg/m ³)		
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70%.		

Notes:

- a. California standards for O₃, CO (except Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, PM (PM₁₀ and PM_{2.5}), and visibility-reducing particles are values not to be exceeded. All others are not to be equaled or exceeded.
- b. National standards (other than O₃, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The O₃ standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM₁₀, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. For PM_{2.5}, the 24-hour standard is attained when 98 percent of daily concentrations, averaged over 3 years, are equal to or less than the standard.
- c. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses.
- d. The levels of air quality necessary to protect the public health.
- e. Air quality levels necessary to protect public welfare from any known or anticipated adverse effects of a pollutant.

AAM = Annual Arithmetic Mean

Source: CARB 2010\

FEDERAL

Federal Clean Air Act and Amendments

The early federal legislative response to air quality concerns consisted of the Air Pollution Control Act of 1955, the Clean Air Act of 1963, and the Air Quality Act of 1967. The goal of the Clean Air Act (CAA) of 1970, as stated by Congress in the 1977 CAA Amendments, was to protect and enhance the quality of the nation's air resources. The Clean Air Act Amendments of 1990 are extremely broad. The major titles of the 1990 Amendments address attainment of air quality standards, mobile source emissions, air toxics, acid rain, a new federal permit program, enforcement, and protection of stratospheric ozone. The titles that most substantially affect the air quality analysis of the proposed project are Title I (attainment and maintenance provisions) and Title II (mobile source provisions).

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STATE

Title I of the Clean Air Act Amendments of 1990

The goal of Title I is to attain federal air quality standards for six criteria pollutants: ozone (O₃), carbon monoxide (CO), particulate matter (PM), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and lead. Pollutant descriptions and associated health effects are summarized in **Table 4.3-3**. National ambient air quality standards (NAAQS) for these criteria pollutants are summarized in **Table 4.3-2** above. The 1990 Amendments to the federal Clean Air Act divided the nation into five categories of planning regions, depending on the severity of their pollution, and set new timetables for attaining the air quality standards. The categories range from marginal to extreme. Attainment deadlines are from 3 to 20 years, depending on the category.

Title I also requires each nonattainment area to submit a comprehensive inventory of actual emissions as part of a State Implementation Plan (SIP) revision to demonstrate the means for achieving federal standards by the established deadlines. Each nonattainment area must achieve a 15 percent reduction from its actual 1990 emissions inventory within 6 years. Thereafter, each area must achieve a 3 percent annual reduction.

Provisions of Section 182 of the 1990 Clean Air Act Amendments relate to ozone nonattainment areas and Sections 186 and 187 relate to carbon monoxide nonattainment areas. These sections emphasize strategies for reducing vehicle miles traveled. Section 182 requires submission of a SIP revision that identifies and adopts specific enforceable transportation control strategies and transportation control measures to offset any growth in emissions from growth in vehicle miles traveled or numbers of vehicle trips in such area to meet statutory requirements for demonstrating periodic emissions reduction requirements. Section 187 makes the same basic requirement applicable to carbon monoxide nonattainment areas. Section 188 sets forth requirements for PM₁₀ nonattainment areas.

TABLE 4.3-3
SUMMARY OF COMMON SOURCES AND EFFECTS OF CRITERIA POLLUTANTS

Pollutant	Description & Common Sources	Health & Welfare Effects
Carbon Monoxide	<ul style="list-style-type: none"> • A colorless, odorless gas. • Common sources include motor vehicle exhaust; indoor sources include kerosene wood-burning stoves. 	<ul style="list-style-type: none"> • Headaches, reduced mental alertness, heart attack, cardiovascular diseases, impaired fetal development, death. • Contributes to the formation of smog.
Sulfur Dioxide	<ul style="list-style-type: none"> • A colorless gas that dissolves in water vapor to form acid, and interacts with other gases and particulates in the air. • Common sources include coal-fired power plants, petroleum refineries, manufacture of sulfuric acid, and smelting of ores containing sulfur. 	<ul style="list-style-type: none"> • Eye irritation, wheezing, chest tightness, shortness of breath, lung damage. • Contributes to the formation of acid rain, visibility impairment, plant and water damage, aesthetic damage.
Nitrogen Dioxide	<ul style="list-style-type: none"> • Reddish brown, highly reactive gas. • Common sources include motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. 	<ul style="list-style-type: none"> • Increased susceptibility to respiratory infections, irritation of the lung and respiratory symptoms (e.g., cough, chest pain, difficulty breathing). • Contributes to the formation of smog, acid rain, water quality deterioration, global warming, and visibility impairment.

Pollutant	Description & Common Sources	Health & Welfare Effects
Ozone	<ul style="list-style-type: none"> Gaseous pollutant formed in the atmosphere from the combination of reactive organic gases and oxides of nitrogen in the presences of sunlight. Common sources include vehicle exhaust. 	<ul style="list-style-type: none"> Eye and throat irritation, coughing, respiratory tract problems, asthma, lung damage. Plant and ecosystem damage.
Lead	<ul style="list-style-type: none"> Metallic element. Common sources include metal refineries, lead smelters, battery manufacturers, iron and steel producers and use of leaded fuels by racing and aircraft industries. 	<ul style="list-style-type: none"> Anemia, high blood pressure, brain and kidney damage, neurological disorders, cancer, lowered IQ. Affects animal and plants, affects aquatic ecosystems.
Particulate Matter	<ul style="list-style-type: none"> Very small particles of dust, soot, or other matter, including tiny droplets of liquids. Common sources include diesel engines, power plants, industries, windblown dust, wood stoves. 	<ul style="list-style-type: none"> Eye irritation, asthma, bronchitis, lung damage, cancer, heavy metal poisoning, cardiovascular effects. Visibility impairment, atmospheric deposition, aesthetic damage, impaired plant photosynthesis.

Source: EPA 2010

Title II of the Clean Air Act Amendments of 1990

Title II of the 1990 Amendments, which contains provisions to control emissions from mobile sources, includes the following measures to reduce pollutants from mobile sources: (1) mandatory use of cleaner, reformulated gasoline in those cities with the most severe ozone problem, (2) use of cleaner fuels, such as methanol and natural gas, to meet particulate standards, and (3) requirements on auto manufacturers to reduce tailpipe emissions of hydrocarbons and oxides of nitrogen. Section 177 of Title II permits California to adopt stricter vehicle emission standards and allows other states to adopt California's stricter standards (see **Table 4.3-2**).

California Clean Air Act

The California Clean Air Act of 1988 (CCAA), amended in 1992, requires all air districts in the state to endeavor to achieve and maintain state ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and particulate matter by the earliest practicable date. California's ambient air quality standards are generally stricter than national standards for the same pollutants. California also has established its own standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles (**Table 4.3-2**).

Toxic Air Contaminants

Toxic air contaminants (TACs) in California are regulated primarily through the Tanner Air Toxics Act (AB 1807 [Statutes of 1983]) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588 [Statutes of 1987]). Assembly Bill (AB) 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted the EPA's list of hazardous air pollutants as TACs. Most recently, diesel PM was added to the CARB list of toxic air contaminants.

4.3 AIR QUALITY

Once a TAC is identified, CARB then adopts an airborne toxics control measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate best available control technology (BACT) to minimize emissions.

Assembly Bill 2588 requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

LOCAL

Imperial County Air Pollution Control District

The entire SSAB, which includes the project area, is under the jurisdiction of the Imperial County Air Pollution Control District (ICAPCD). ICAPCD is the local air quality agency and shares responsibility with CARB for ensuring that state and federal ambient air quality standards are achieved and maintained in the SSAB. Furthermore, ICAPCD adopts and enforces controls on stationary sources of air pollutants through its permit and inspection programs and regulates agricultural burning. Other ICAPCD responsibilities include monitoring ambient air quality, preparing clean air plans, planning activities such as modeling and maintenance of the emission inventory, and responding to citizen air quality complaints. Districts in state nonattainment areas are also responsible for developing and implementing transportation control measures necessary to achieve the state ambient air quality standards (**Table 4.3-2**).

Air quality in the area is a function of the criteria pollutants emitted locally, the existing regional ambient air quality, and the meteorological and topographic factors, which influence the intrusion of pollutants into the area from sources outside the immediate vicinity.

An Authority to Construct permit for the emissions associated with the drilling and flow testing of six project exploration wells was issued by ICAPCD. An Authority to Construct permit application for the proposed power plant and development wells was subsequently submitted to ICAPCD and amended to include the use of a regenerative thermal oxidizer (RTO) and caustic scrubber system, instead of the initially proposed scrubber system, to abate hydrogen sulfide and benzene air pollutant emissions from the facility. The permits will limit the allowable air emissions that can be released by the respective project facilities during construction and operations.

IMPERIAL COUNTY GENERAL PLAN

The County's General Plan contains two elements, the Conservation and Open Space Element and the Land Use Element, that set forth goals and objectives to improve air quality and protect the health and welfare of county residents. Goals and objectives are accomplished by seeking to comply with current federal and state requirements regarding air quality as well as by cooperating with ICAPCD in their mission to reduce air pollutants. **Table 4.3-4** analyzes the proposed project's consistency with County of Imperial General Plan air quality objectives.

While this Draft EIR analyzes the proposed East Brawley Geothermal Development project's consistency with the Imperial County General Plan, pursuant to CEQA Section 15125(d), it is the Board of Supervisors that will make the determination of the project's consistency with the identified General Plan policies.

**TABLE 4.3-4
PROJECT CONSISTENCY WITH APPLICABLE GENERAL PLAN GOALS AND OBJECTIVES**

General Plan Goals and Objectives	Consistency with General Plan	Analysis
Conservation and Open Space Element		
Objective 9.1. Ensure that all facilities shall comply with current federal and state requirements for attainment of air quality objectives.	Yes	Implementation of the proposed project would result in a privately owned 49.9 net megawatt geothermal power plant north of the City of Brawley in unincorporated Imperial County. Regulation of new potential air pollution sources are the responsibility of ICAPCD. Direct sources of air contaminants are required to obtain specific operational permits from ICAPCD. All new development requiring environmental review would be subject to ICAPCD review, which may impose mitigation measures to reduce any air quality impacts to a less than significant level. The proposed project is required to comply with the applicable air quality mitigation measures established in the Imperial County General Plan EIR, which have been adopted as goals and objectives.
Objective 9.2. Cooperate with all federal and state agencies in the effort to attain air quality objectives.	Yes	See response to Conservation and Open Space Objective 9.1.
Land Use Element		
Objectives 9.6. Incorporate the strategies of the Imperial County Air Quality Attainment Plan (AQAP) in land use planning decisions. The policies stated in the 1991 AQAP include L-1, Planning Compact Communities; L-2, Providing for Mixed Land Use; L-3, Balancing Jobs and Housing; and L-4, Circulation Management.	Yes	ICAPCD has recently adopted the Final 2009 8-Hour Ozone Modified Air Quality Management Plan, the Final 2008 Reasonably Available Control Technology State Implementation Plan, and the Final PM ₁₀ 2009 State Implementation Plan with the purpose of achieving attainment for federal and state ozone and PM ₁₀ standards. All new development requiring environmental review would be subject to ICAPCD review, which may impose mitigation measures to reduce any air quality impacts to a less than significant level. Additionally, the proposed project is required to comply with the applicable air quality mitigation measures established in the Imperial County General Plan EIR, which have been adopted as policies and objectives.
Objective 9.7. Implement a review procedure for land use planning and discretionary project review which includes the Imperial County Air Pollution Control District.	Yes	See response to Land Use Objective 9.6.

**Non-applicable policies and programs have been omitted.*

4.3 AIR QUALITY

4.2.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following State CEQA Guidelines Appendix G. A significant impact to air quality would occur if implementation of the proposed project would result in the following:

- Conflict with or obstruct implementation of the acceptable air quality plan.
- Violate any air quality standard or contributes substantially to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.

METHODOLOGY

The following analysis is based primarily on the Air Quality Impact Analysis prepared for the proposed project by Environmental Management Associates, Inc. (2010) (see **Appendix D**). Emission estimates for grading, paving, and construction associated with the power plant, and the grading and construction of each well pad, were estimated using the CARB-approved URBEMIS2007 model (version 9.2.4), a computer program that uses standard EPA and CARB techniques to estimate air pollution emissions for various land uses, area sources, construction projects, and project operations.

The analysis of air quality issues follows the guidance provided in the State CEQA Guidelines. The Guidelines state that a project will result in a potentially significant impact if it would violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, result in a net increase of any criteria pollutant for which the region is in nonattainment, create or contribute to a non-stationary source "hot-spot" (primarily carbon monoxide), expose sensitive receptors to substantial pollutant concentrations, or create objectionable odors that affect a substantial number of people.

PROJECT IMPACTS AND MITIGATION MEASURES

Conflict with or Obstruct Implementation of Applicable Air Quality Plans

Impact 4.3.1 Implementation of the proposed project would not result in violations or contributions to existing violations of air quality standards and does not therefore conflict with one or more applicable air quality plans. This impact is considered **less than significant with mitigation**.

The proposed project has a negligible potential to conflict with or obstruct the implementation of applicable ICAPCD air quality plans (Final 2009 8-Hour Ozone Modified Air Quality Management Plan, Final 2008 Reasonably Available Control Technology State Implementation

Plan, and Final PM₁₀ 2009 State Implementation Plan). These documents constitute the region's State Implementation Plan (SIP). California's SIPs are a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, state regulations, and federal controls describing how the state will attain national ambient air quality standards (NAAQS) for ozone and PM₁₀. State law makes CARB the lead agency for all purposes related to the SIP. Local air districts, including the Imperial County Air Pollution Control District, prepare SIP elements and submit them to CARB for review and approval. Generally, project compliance with all of the ICAPCD rules and regulations results in conformance with the state and ICAPCD air quality plans. The proposed project has prepared and submitted applications to ICAPCD for permits (Authority to Construct) for the power plant and production wells and injection wells that document how the project would comply with all applicable ICAPCD rules, regulations, and requirements for controlling emissions of the nonattainment air pollutants and their precursors.

ICAPCD Rule 925 establishes the conformity criteria and procedures necessary to ensure that federal actions conform to the SIP and meet the provisions of the Clean Air Act. In general, this rule ensures that all criteria air pollutant emissions are specifically identified and accounted for in the SIP's attainment or maintenance demonstration as well as conformance to a SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. Since the project is proposed in a federally classified nonattainment area, the provisions of the final rule for conformity apply to the project for PM₁₀ and O₃. However, actions are exempted when the totals of direct and indirect emissions are below specified emissions levels [40 CFR Section 51.853(b)1] (EMA 2010, p. 12). The applicable level is 70 tons per project per year for PM₁₀ in a serious nonattainment area. ROG and NO_x, as precursors to O₃, are governed in an O₃ nonattainment area, and the applicable levels are 100 tons per year per project in an O₃ nonattainment area that is not serious or extreme and also in an area that is outside an O₃ transport region.

Maximum annual PM₁₀ emissions from the project are anticipated to be less than 25 tons, which would occur during project operations, and are less than the specified 70 tons per year threshold (EMA 2010, p. 12). Maximum annual ROG and NO_x emissions, which would also occur during the operations phase, would be just under 30 and 5 tons, respectively, and are also less than the applicable 100 tons per year threshold (EMA 2010, p. 12). (Refer to **Table 4.2-6** below for emissions totals.)

Nevertheless, the provisions of the final rule will apply in a nonattainment area if the emissions of concern are above 10 percent of this area's total emissions [40 CFR Section 51.853(i)]. The SIP totals for Imperial County are approximately 24,000 tons per year for PM₁₀, 15,000 tons per year for ROG, and 17,000 tons per year for NO_x. Therefore the proposed project's anticipated annual PM₁₀, ROG, and NO_x emissions of less than 25 tons, 30 tons, and 5 tons per year, respectively, would be less than 10 percent of the respective regional emissions (EMA 2010, p. 12). Thus, the proposed project is exempt from any further review for conformity determination for PM₁₀ and O₃.

Imperial County General Plan Land Use Element Objective 9.6 mandates the incorporation of the air quality impact reduction strategies of ICAPCD's air quality plans. ICAPCD recently adopted the Final 2009 8-Hour Ozone Modified Air Quality Management Plan, the Final 2008 Reasonably Available Control Technology State Implementation Plan, and the Final PM₁₀ 2009 State Implementation Plan with the purpose of achieving attainment for federal and state ozone and PM₁₀ standards. The proposed project would be subject to ICAPCD review (i.e., Authority to Construct permit) as well as the air quality impact reduction strategies of ICAPCD's air quality plans as mandated by the County Land Use Element's Objective 9.6.

4.3 AIR QUALITY

As the proposed project is required to comply with all applicable ICAPCD rules, regulations, and requirements for controlling emissions of the nonattainment air pollutants and their precursors, it would not conflict with or obstruct implementation of any air quality plans. This impact is **less than significant**.

Mitigation Measures

None required.

Violate an Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation

Impact 4.3.2 Construction of the proposed project would result in short-term emissions of criteria air pollutants from construction equipment operation and soil disturbances, potentially violating or contributing to an existing violation of one or more air quality standards. This impact is **less than significant with mitigation**.

Construction of the power plant, new access roads, and pipelines, as well as the proposed upgrades to the City of Brawley Wastewater Treatment Plant (BWWTP), would produce fugitive dust from site grading and equipment movement. Construction of the power plant would directly disturb a total of about 15 acres of land, and another 10 acres would be disturbed for the temporary, adjacent equipment laydown, fabrication, and construction parking area (although the equipment laydown, fabrication, and construction parking area would be reclaimed following the completion of construction). In addition, up to 40 new 2.6-acre well pads (which is a conservative number of wells) would be constructed, disturbing an additional 104 acres over the life of the project. The upgrades to the BWWTP are not anticipated to result in any ground disturbance; however, as a conservative measure the air quality study assumed that these upgrades would disturb an additional 3 acres. Construction of the BWWTP improvements is assumed to occur over an approximately 11-month period; however, the first few months will be dedicated to detailed design and procurement. Foundation construction will occur during months 3–6; mechanical and electrical construction during months 6–9; and startup and commissioning in months 9–11.

Because 5 or more acres of land would be disturbed by construction activity, the proposed project is required to develop and implement a dust control plan consistent with the ICAPCD Rule 801 requirements for construction activities. The purpose of this rule is to reduce the amount of PM₁₀ entrained in the ambient air as a result of emissions generated from construction and other earthmoving activities by requiring actions to prevent, reduce, or mitigate PM₁₀ emissions. In addition, the project is required to adopt best available control measures to minimize emissions from surface-disturbing activities to comply with ICAPCD Regulation VIII (Fugitive Dust Rules). These measures include the following:

- All disturbed areas, including bulk material storage which is not being actively utilized, shall be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by using water, chemical stabilizers, dust suppressants, tarps, or other suitable material such as vegetative ground cover.
- All on-site and off-site unpaved roads will be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants, and/or watering.

- All unpaved traffic areas of 1 acre or more with 75 or more average vehicle trips per day will be effectively stabilized and visible emission shall be limited to no greater than 20 percent opacity for dust emissions by paving, chemical stabilizers, dust suppressants, and/or watering.
- The transport of bulk materials shall be completely covered unless 6 inches of freeboard space from the top of the container is maintained with no spillage and loss of bulk material. In addition, the cargo compartment of all haul trucks is to be cleaned and/or washed at delivery site after removal of bulk material.
- All track-out or carry-out will be cleaned at the end of each workday or immediately when mud or dirt extends a cumulative distance of 50 linear feet or more onto a paved road within an urban area.
- Bulk material handling or transfer shall be stabilized prior to handling or at points of transfer with application of sufficient water, chemical stabilizers, or by sheltering or enclosing the operation and transfer line.
- The construction of any new unpaved road is prohibited within any area with a population of 500 or more unless the road meets the definition of a temporary unpaved road. Any temporary unpaved road shall be effectively stabilized and visible emissions shall be limited to no greater than 20 percent opacity for dust emission by paving, chemical stabilizers, dust suppressants and/or watering. (ICAPCD 2007)

Construction of Power Plant and Wastewater Treatment Plant Upgrade

The maximum annual air pollutant emissions estimated by URBEMIS (abated using the methods described above) for construction of the power plant and each well pad is provided in **Table 4.3-5**. The projected emissions resulting from upgrades to the BWWTP have been factored into the overall construction schedule.

**TABLE 4.3-5
MAXIMUM ESTIMATED AIR POLLUTANT EMISSIONS
FROM CONSTRUCTION ACTIVITIES¹**

Source	ROG ²	NO _x	CO	SO ₂	PM ₁₀
	Tons per Year				
Site Construction 2010 ¹	0.10	0.76	0.44	0.00	1.33
Site Construction 2011 ¹	5.61	6.66	14.57	0.01	1.93
Site Construction 2012 ¹	3.34	5.94	14.40	0.01	0.34
Tons per Pad					
Well Pad Construction	0.03	0.28	0.15	0.00	0.07

¹ Assumes construction begins November 1, 2010, and ends January 30, 2012, and assumes BWWTP construction begins December 1, 2011, and ends October 31, 2012.

² Reactive organic gases (ROG) are non-methane organic compound emissions that are assumed to be precursors to the formation of secondary photochemical oxidant air pollutants in the atmosphere, including ozone.

Source: EMA 2010, p. 6

4.3 AIR QUALITY

For the purposes of this analysis, it is anticipated that construction activities and associated emissions will be completed within a 15-month period. There will be a 2-month overlap of the 11-month BWWTP construction added to the power plant construction, resulting in a total of 24 months for the construction phase. Up to 60 workers would commute to the project area by passenger vehicles to the project site during peak BWWTP construction, but the combined peak traffic will remain below 200 workers commuting to the project site during the combined peak period. These emissions are small and their impacts would be low (EMA 2010, p. 6). Construction vehicles will release fuel combustion emissions during site construction activities. Up to 200 workers will also commute by passenger vehicles to the project site during peak construction. Emissions from worker vehicles commuting to the project site are included in the URBEMIS model used to make the estimates provided above in **Table 4.3-5**.

Well Drilling and Testing Emissions

The geothermal production and injection wells and the cooling tower blowdown/condensate/aerated brine injection well would be drilled by a contractor using a drilling rig powered by diesel engines registered as using best available control technology through portable equipment permits issued by CARB. Any rig engines used on-site for drilling each well not registered with CARB would be listed on a separate stationary source air permit issued to the drilling company by ICAPCD (EMA 2010, p. 7).

Some hydrogen sulfide would be emitted to the atmosphere if the wells are flow tested once drilling is complete. The amount of hydrogen sulfide emitted to the air would be small, because a well flow test is short in duration (EMA 2010, p. 7). Assuming that the geothermal fluid contains 70 ppm of hydrogen sulfide and that all of the hydrogen sulfide in the geothermal fluid is released to the atmosphere upon flashing (the change of fluid into steam), a well flow test conducted at rate of 500,000 pounds per hour would emit hydrogen sulfide at a rate of about 35 pounds per hour (EMA 2010, p. 7). Only one well is typically flow tested at a time (Thomas 2010).

Typically, only one well is drilled at a time in a geothermal wellfield. A reasonable estimate for the maximum number of wells that could be drilled as a result of the project is one per month due to the time needed to mobilize and demobilize the necessary well-drilling equipment (Thomas 2010). At a rate of one well drilled per month, the project would drill all of the proposed wells in approximately three years. However, such a rate of well drilling is not expected, as many of the proposed wells are projected to be replacement wells as needed over the life span of the project (Thomas 2010). A negligible to the point of unquantifiable amount of hydrogen sulfide would be released from the circulating drilling fluid during drilling activities (Thomas 2010).

Well site construction and drilling and well testing activities would generate a small number of daily one-way vehicle trips (as many as 40 or more trucks and 12–16 small trucks/service vehicles/worker vehicles on peak days). These vehicles will release fuel combustion emissions during the well drilling and testing operations. About 50–60 workers would commute to the project during well site construction, but these operations would be short term and temporary. Truck, service vehicle, and worker vehicle traffic during project operations would be substantially smaller. The air pollutant emissions from these small numbers of vehicles would have a negligible impact on air quality in Imperial County.

Construction of the proposed project would result in short-term emissions of criteria air pollutants from construction equipment operation and soil disturbances, but would not violate or significantly contribute to an existing violation of one or more air quality standards. This impact

would therefore be **less than significant with mitigation**. In concurrence with ICAPCD recommendations, the following mitigation is required.

Mitigation Measures

MM 4.3.2a The following fugitive PM₁₀ control measures shall be implemented where feasible, in addition to the requirements of ICAPCD Regulation VIII, at the project site during all construction activities:

- a. Water exposed soil with adequate frequency for continued moist soil.
- b. Replace ground cover in disturbed areas as quickly as possible.
- c. Install automatic sprinkler system on all soil piles.
- d. Limit vehicle speed for all construction vehicles to a maximum of 15 mph on any unpaved surface at the construction site.
- e. Develop a trip reduction plan to achieve a 1.5 average vehicle ridership (AVR) for construction employees

Timing/Implementation: Mitigation shall be implemented throughout project construction phase

Enforcement/Monitoring: Imperial County Planning and Development Services Department

MM 4.3.2b The following construction equipment control measures shall be implemented at the project site during all construction activities, when feasible:

- a. Use alternative-fueled or catalyst-equipped diesel construction equipment, including all off-road and portable diesel-powered equipment.
- b. Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes at a maximum.
- c. Limit, to the extent feasible, the hours of operation of heavy-duty equipment and/or the amount of equipment in use.
- d. Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set).

Timing/Implementation: Mitigation shall be implemented throughout project construction phase

Enforcement/Monitoring: Imperial County Planning and Development Services Department

Implementation of mitigation measures **MM 4.3.2a** and **MM 4.3.2b** would minimize criteria air pollutants during the project's construction phase and would reduce this impact to a **less than significant** level.

4.3 AIR QUALITY

Violate Air Quality Standards Due to Long-Term Operational Emissions of Criteria Air Pollutants

Impact 4.3.3 Operation of the proposed project would result in long-term emissions of criteria air pollutants from mobile and area sources that could violate or substantially contribute to an existing violation of one or more air quality standards. This impact is **less than significant with mitigation**.

Power Generation Operations Emissions

Power generation operations would create potential sources of noncondensable gas (NCG) emissions, cooling tower particulate emissions, intermittent diesel fuel combustion emissions, and fugitive emissions of the volatile motive fluid (isopentane) (EMA 2010, p. 7). A discussion of these emissions is provided in detail below.

Geothermal Noncondensable Gas Emissions

Under assumed operating conditions, almost all of the NCGs in the geothermal fluid would be separated from the produced geothermal fluid at the respective production well sites and transported via the NCG pipeline system to the injection wells (EMA 2010, p. 7). There, the separated NCGs would be intermingled with the geothermal injection fluid and injected back into the subsurface geothermal reservoir with no air emissions (EMA 2010, p. 7). However, if very high concentrations of NCGs are encountered in the new geothermal production wells, then up to 25 percent of the NCGs produced from the geothermal fluid would be routed to the power plant site for abatement of certain air pollutants. The NCGs would be separated from the geothermal fluid in the well pad high-pressure separators and directed to the emission abatement equipment (discussed below) on the power plant site (EMA 2010, p. 7).

Other Facility Emission Sources

Air pollutants from the other identified power generation facility emission sources would include (a) NCG air pollutants from the sand separators at the production well sites; (b) NCG air pollutants from the pipeline condensate drains; (c) PM₁₀ emissions from the two cooling towers; (d) diesel combustion emissions from the standby diesel engine-generator and the diesel fire pump engine; and (e) fugitive emissions of isopentane from the Ormatt Energy Converter (OEC) units. Isopentane is an organic compound with a variety of uses, ranging from an ingredient in cosmetics to a component in geothermal power plants. This solvent is extremely flammable. Its tendency to evaporate makes it useful for dissolving compounds, since it is easily evaporated away. Isopentane smells like gasoline and does not dissolve in water, but floats on top of it. Isopentane is used in geothermal plant processes as geothermal plants tap into heat energy deep in the earth and convert it to electricity. Hot water from the geothermal energy heats liquid isopentane and turns it into a gas. This gas then drives a turbine and generator to generate the power plant's electricity.

Fugitive Isopentane Emissions

Each OEC unit would have minute leaks of the motive fluid (isopentane) from valves, connections, seals, and tubes, which would be released either to the atmosphere or into the geothermal fluid or circulating cooling water lines. Isopentane would also be discharged to the atmosphere from OEC unit vapor recovery units (through which air leaked into the isopentane condensers is discharged to recover isopentane vapors) and during OEC unit maintenance activities. The annual fugitive emissions of isopentane from the project without mitigation are

estimated at about 25 tons (Table 4.3-6) based on inventory losses at similar facilities. Isopentane is a reactive organic compound (ROC) as defined by ICAPCD.

The projected air pollutant emissions without mitigation from each of the power generation air pollutant emission sources are summarized in Table 4.3-6.

Wastewater Treatment Plant Upgrades

No criteria air pollutants emissions would result from the proposed tertiary treatment of wastewater as a source of power plant cooling water (EMA 2010, p. 10). Tertiary treatment would occur at new treatment facilities constructed within the footprint of an existing wastewater treatment pond at the neighboring Brawley wastewater treatment plant (see Appendix C). The tertiary treatment would be predominantly physical processes including mixing and flocculation of solids, sediment removal, filtration, and ultraviolet (UV) disinfection. Under normal operations a light dosage of sodium hypochlorite would be injected into the effluent pump to maintain residual disinfectant. Sodium hypochlorite is a chemical compound containing chlorine in an oxidated state, meaning that it has lost electrons. Sodium hypochlorite is a liquid chemical compound normally used for cleaning and purification. When in a solution, it is commonly known as chlorine bleach. This chemical compound can be dangerous if swallowed.

**TABLE 4.3-6
SUMMARY OF PROJECTED POWER GENERATION AIR POLLUTANT
EMISSIONS BEFORE ABATEMENT BY EMISSION SOURCE (TONS PER YEAR)**

Emission Source	PM ₁₀	SO ₂	CO	NO _x	ROC ¹	H ₂ S	NH ₃	C ₆ H ₆ ¹
	Tons per Year							
High Pressure Separator	0.00	0.00	0.00	0.00	48.87	12.79	1.53	48.87
RTO Unit/Scrubber NCG Abatement System Emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sand Separators NCG Emissions	0.00	0.00	0.00	0.00	2.27	0.45	57.13	2.27
Injection Filters NCG Emissions	0.00	0.00	0.00	0.00	0.05	0.01	1.32	0.05
NCG Pipeline Condensate Drains Emissions	0.00	0.00	0.00	0.00	0.003	0.0007	0.08	0.003
North Cooling Tower Emissions	11.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
South Cooling Tower Emissions	11.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	0.00	0.00	24.82	0.00	0.00	0.00
Emergency Standby Diesel Fire-Water Pump Engine	0.0011	0.0001	0.0071	0.06	0.0017	0.00	0.00	0.00
Emergency Standby	0.0059	0.0002	0.103	0.11	0.003	0.00	0.00	0.00

4.3 AIR QUALITY

Emission Source	PM ₁₀	SO ₂	CO	NO _x	ROC ¹	H ₂ S	NH ₃	C ₆ H ₆ ¹
	Tons per Year							
Diesel Generator Engine								
Total	22.63	0.00	0.10	0.17	76.02	13.25	60.08	51.20
ICAPCD Rule 207.C.2.a Significance Threshold	25	25	25	25	25	--	--	--
Significant	No	No	No	No	Yes	No	No	No

¹ ROC – reactive organic compound, H₂S – hydrogen sulfide, NH₃ – ammonia, C₆H₆ – benzene. Benzene is also listed as a ROC.

Source: EMA 2010, Appendix B

Projects that have the potential to emit regulated air pollutants must comply with ICAPCD and EPA rules and regulations. New Source Review (ICAPCD Rule 207) requires that any new or modified air pollution emission unit emitting any nonattainment air pollutant or its precursors in excess of 25 pounds per day, or 55 pounds per day of H₂S, must utilize best available control technology (BACT). The north and south cooling towers of the proposed project have the potential to emit more than 25 pounds per day of PM₁₀ and will require BACT in the form of high-efficiency drift eliminators (EMA 2010, p. 11). In addition, the wellhead high-pressure separators have the potential to emit reactive organic compounds from the geothermal NCG in excess of 25 pounds per day. A regenerative thermal oxidizer unit and caustic scrubber abatement system, described below, is considered BACT for these emissions. Lastly, each OEC unit also has the potential to emit more than 25 pounds per day of fugitive ROC (isopentane) emissions; BACT, in the form of inspection, monitoring, and use of a maintenance vapor recovery unit, would limit these emissions (EMA 2010, p. 11).

Regenerative Thermal Oxidizer Unit/Caustic Scrubber Abatement System

A regenerative thermal oxidizer (RTO) unit and caustic scrubber system is proposed to be used to abate the combustible NCG air pollutant emissions. The RTO unit would remove by thermal oxidation essentially all of the ammonia and a minimum of 98 percent of the methane (CH₄), benzene (C₆H₆), and hydrogen sulfide (H₂S) in the geothermal NCG delivered to the RTO unit (EMA 2010, p. 7). The oxidization of H₂S by the RTO unit would produce sulfur dioxide (SO₂), and the oxidization of ammonia by the RTO unit would produce oxides of nitrogen (NO_x). About 97.5 percent of the SO₂ created in the RTO unit would be removed by the caustic scrubber (EMA 2010, p. 8). Some PM₁₀ emissions would be generated from the scrubber, resulting from the dissolved solids in the caustic scrubbing liquid which would be entrained in the gases emitted from the scrubber stack. The RTO/scrubber system represents BACT for removal of the H₂S and C₆H₆ in the NCG. The projected air pollutant emissions with implementation of the RTO unit and scrubber system from each of the power generation air pollutant emission sources, as well as daily emissions from the RTO/scrubber itself, including both the NCG and the RTO combustion emissions are summarized below in **Table 4.3-7**.

**TABLE 4.3-7
SUMMARY OF PROJECTED POWER GENERATION AIR POLLUTANT
EMISSIONS AFTER ABATEMENT BY EMISSION SOURCE (RTO OPERATING) (TONS PER YEAR)**

Emission Source	PM ₁₀	SO ₂	CO	NO _x	ROC ¹	H ₂ S	NH ₃	C ₆ H ₆ ¹
	Tons per Year							
High Pressure Separator	0.00	0.00	0.00	0.00	1.54	0.40	0.05	1.54
RTO Unit/Scrubber NCG Abatement System Emissions	2.12	0.57	0.00	4.02	0.95	0.25	0.00	0.95
Sand Separators NCG Emissions	0.00	0.00	0.00	0.00	2.27	0.45	57.14	2.24
Injection Filters NCG Emissions	0.00	0.00	0.00	0.00	0.05	0.01	1.32	0.05
NCG Pipeline Condensate Drains Emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
North Cooling Tower Emissions	11.32	0.00	0.0	0.00	0.00	0.00	0.00	0.00
South Cooling Tower Emissions	11.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OEC Isopentane Emissions	0.00	0.00	0.00	0.00	24.82	0.00	0.00	0.00
Emergency Standby Diesel Fire-Water Pump Engine	0.00	0.00	0.01	0.06	0.00	0.00	0.00	0.00
Emergency Standby Diesel Generator Engine	0.01	0.00	0.10	0.11	0.00	0.00	0.00	0.00
Total	24.76	0.57	0.11	4.20	29.64	1.11	58.60	4.82
ICAPCD Rule 207.C.2.a Significance Threshold	25	25	25	25	25	--	--	--
Significant	No	No	No	No	Yes	No	No	No

¹ ROC – reactive organic compound, H₂S – hydrogen sulfide, NH₃ – ammonia, C₆H₆ – benzene. Benzene is also listed as a ROC.

Source: EMA 2010, p. 9

ICAPCD Rule 207.C.2.a requires offsets for facility emissions of each regulated air pollutant in excess of 137 pounds per day. As seen in **Table 4.3-7**, even with implementation of the RTO unit and scrubber system, the power plant would emit 29.64 tons per year (161 pounds per day) of ROCs, which is in excess of 137 pounds per day, so offsets would be required for these excess project emissions at a rate of 1.2 to 1.0. ICAPCD maintains a list of entities that own eligible ROC emission offset credits. Upon issuance of the Authority to Construct for the project from ICAPCD, the proposed project would contact and purchase the necessary ROC emission offset credits from one or more of these entities. The acquisition of offset credits will not be made until the plant is under construction. Implementation of the offset mitigation would reduce the net emissions of ROCs in the Salton Sea Air Basin, because of the 1.2/1.0 offsets.

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As discussed above, the proposed project would need to comply with ICAPCD Rule 207 by utilizing the appropriate BACTs with specific emitting sources in order to mitigate emissions from these sources of the proposed project. In addition, the proposed project will need to fulfill its obligations mandated in ICAPCD Rule 207.C.2.a in order to mitigate project air pollutants associated with ozone or PM₁₀ in excess of 137 pounds per day, which involves the purchase of necessary ROC emission offset credits from one or more entities. Implementation of the appropriate BACTs and the offset mitigation would reduce the net emissions of ROCs in the Salton Sea Air Basin (EMA 2010, p. 12) to **less than significant with mitigation**.

Mitigation Measures

MM 4.3.3a The proposed project shall be required to implement the use of a regenerative thermal oxidizer (RTO) unit and caustic scrubber system, which shall be used to abate the combustible noncondensable gas air pollutant emissions, during project operations. The RTO/scrubber system represents best available control technology for removal of H₂S and C₆H₆ in the noncondensable gas. In addition, the proposed project shall be required to implement the use of a maintenance vapor recovery unit to limit OEC unit emissions as well as high-efficiency drift eliminators to abate PM₁₀ emissions from the north and south cooling towers.

Timing/Implementation: Ongoing

Enforcement/Monitoring: Imperial County Planning and Development Services Department in coordination with the Imperial County Air Pollution Control District

MM 4.3.3b The proposed project shall be required to fulfill its obligations mandated in Imperial County Air Pollution Control District Rule 207.C.2.a in order to mitigate project air pollutants associated with ozone or PM₁₀ in excess of 137 pounds per day with the purchase of necessary ROC emission offset credits from one or more entities prior to the issuance of construction permits.

Timing/Implementation: Prior to the issuance of grading permits

Enforcement/Monitoring: Imperial County Planning and Development Services Department in coordination with the Imperial County Air Pollution Control District

Implementation of mitigation measures **MM 4.3.3a** and **MM 4.3.3b** would ensure compliance with ICAPCD Rule 207 requiring utilization of the appropriate BACTs with specific emitting sources (RTO/scrubber abatement system) as well as with ICAPCD Rule 207.C.2.a, which involves the purchase of necessary ROC emission offset credits from one or more entities. This impact would be **less than significant**.

Violate Air Quality Standard for Near-Term Local Mobile-Source Carbon Monoxide

Impact 4.3.4 Implementation of the proposed project would not be anticipated to contribute to localized concentrations of mobile-source CO that would exceed applicable ambient air quality standards. This impact is considered **less than significant**.

A carbon monoxide hot spot is a localized concentration of carbon monoxide that is above state and/or federal 1-hour or 8-hour ambient air standards and is generally associated with idling or slow-moving traffic. Based on ICAPCD guidance, the proposed project can be said to have no potential to create a violation of the CO standard if neither of the following criteria are met:

- A traffic study for the proposed project indicates that the levels of service (LOS) on one or more streets or at one or more intersections in the project vicinity will be reduced to LOS E or F; or
- A traffic study indicates that the proposed project will substantially worsen an already existing LOS F on one or more streets or at one or more intersections in the project vicinity.

According to data provided in the traffic study (see **Appendix N**), the proposed East Brawley Geothermal Development project is estimated to generate 84 daily vehicles. The surrounding study area intersections are each operating at an acceptable LOS A in the AM and PM peak periods, and with the addition of the project, the surrounding roadways and intersections will continue to operate at LOS A (Darnell & Associates 2009).

Since significant impacts would not occur at the surrounding intersections, no significant impacts are anticipated to occur in the project vicinity. Consequently, sensitive receptors would not be significantly affected by localized CO emissions generated by project-related traffic. Therefore, this impact is **less than significant**.

Mitigation Measures

None required.

Exposure of Public to Hazardous Air Pollutants

Impact 4.3.5 Project operations will result in low levels of hazardous air pollutant emissions in the vicinity of the project site. This impact is **potentially significant**.

Hazardous Air Pollutants

Benzene (C₆H₆) is considered a federal hazardous air pollutant (HAP) due to its toxicity and it is also considered a ROC by ICAPCD. A low concentration of C₆H₆ occurs naturally in the geothermal NCG and has the potential to be emitted from the project NCG emission sources. Other federal HAP emissions from the project would be those emissions associated with the intermittent combustion of diesel fuel by the standby emergency diesel generator and emergency fire pump diesel engine. Mitigation measure **MM 4.3.3a**, above, would require the implementation of a RTO/scrubber system, which represents BACT for removal of C₆H₆ in the noncondensable gas emissions. A summary of the HAP emissions from the project operations before factoring the emissions reductions resulting from mitigation measure **MM 4.3.3a** is provided in **Table 4.3-8**, while HAP emissions from the project operations after **MM 4.3.3a** are identified in **Table 4.3-9**.

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**TABLE 4.3-8
HAZARDOUS AIR POLLUTANT EMISSIONS BEFORE ABATEMENT (MM 4.3.3A)**

Emission Source	Hazardous Air Pollutant Emission (tons/year)		
	Diesel HAPs	C ₆ H ₆	Totals
High Pressure Separator Emissions	0.00000	48.8754	48.8754
RTO Unit/Scrubber NCG Abatement System Emissions	0.00000	0.0000	0.94671
Sand Separators NCG Emissions	0.0000	2.27388	2.27388
Injection Filters NCG Emissions	0.0000	0.05273	0.05273
NCG Pipeline Condensate Drains Emissions	0.00000	0.00356	0.00356
North Cooling Tower	0.00000	0.00000	0.00000
South Cooling Tower	0.00000	0.00000	0.00000
OEC Isopentane Emissions	0.00000	0.00000	0.00000
Emergency Standby Diesel Fire-Water Pump	0.00184	0.00000	0.00184
Emergency Standby Diesel Generator	0.01015	0.00000	0.01015
Totals	0.01199	51.2056	52.1642

Source: EMA 2010, Appendix B

**TABLE 4.3-9
HAZARDOUS AIR POLLUTANT EMISSIONS AFTER ABATEMENT (MM 4.3.3A)**

Emission Source	Hazardous Air Pollutant Emission (tons/year)		
	Diesel HAPs	C ₆ H ₆	Totals
High Pressure Separator Emissions	0.00000	1.53991	1.53991
RTO Unit/Scrubber NCG Abatement System Emissions	0.00000	0.94671	0.94671
Sand Separators NCG Emissions	0.0000	2.27388	2.27388
Injection Filters NCG Emissions	0.0000	0.05273	0.05273
NCG Pipeline Condensate Drains Emissions	0.00000	0.00356	0.00356
North Cooling Tower	0.00000	0.00000	0.00000
South Cooling Tower	0.00000	0.00000	0.00000
OEC Isopentane Emissions	0.00000	0.00000	0.00000
Emergency Standby Diesel Fire-Water Pump	0.00184	0.00000	0.00184
Emergency Standby Diesel Generator	0.01015	0.00000	0.01015
Totals	0.01199	4.81678	4.82877

Source: EMA 2010, p. 10

Air quality modeling conducted (see **Appendix D**) for the project projected the long-term average C₆H₆ stack emissions from the power plant. These emissions were used to model the potential health hazard from the project at residences and other industrial and commercial facilities within 1 mile of the power plant site. The health risk assessment determined that the residential receptor with the highest modeled, 5-year average, annual C₆H₆ concentration

would have a projected cancer risk factor of 7.52×10^{-7} , and this same residential receptor would have an inhalation cancer potency risk factor of 9.77×10^{-7} , each of which is below the generally accepted *de minimus* project cancer risk of one in one million.¹

Major Stationary Source

Major stationary sources are subject to the requirements of Title V of the federal Clean Air Act Amendments of 1990. ICAPCD District Rule 900.B20 defines a “major source” as a stationary source which has the potential to emit either a regulated air pollutant in quantities equal to or exceeding 100 tons per year or a single HAP in quantities equal to or exceeding 10 tons per year, or any lesser quantity threshold promulgated by the EPA. The project would not emit more than 100 tons per year of any regulated air pollutant. However, without the proposed RTO/scrubber emission abatement, the project has the potential to emit more than 10 tons per year of the HAP benzene, and pursuant to Rule 900 of ICAPCD, the project would be considered a major stationary source unless the abatement of the benzene is federally enforceable. Thus the requirement of mitigation measure **MM 4.3.3a** above, which mandates the implementation of a regenerative thermal oxidizer (RTO) unit and caustic scrubber system as well as a maintenance vapor recovery unit to limit OEC unit emissions and high-efficiency drift eliminators to abate PM₁₀ emissions from the north and south cooling towers, as part of the proposed project.

Under ICAPCD Rule 902, the owners or operators of a stationary source that would otherwise be a major source (pursuant to Rule 900) may request and accept federally enforceable emission limits to become a “synthetic” minor source, thereby avoiding Title V requirements. As part of a pending revised air permit application, the project applicant is submitting a request for synthetic minor source status because the proposed RTO unit/caustic scrubber system would reduce the facility's emissions of C₆H₆ to under the 10 tons per year threshold (see **Table 4.3-7**). Under synthetic minor source status, the project would not be a major source and would not be subject to ICAPCD Rule 900. However, until the pending air permit application requesting for synthetic minor source status is approved, this impact would be considered **potentially significant**.

Mitigation Measures

MM 4.3.5 The proposed project shall achieve synthetic minor source status in order to mitigate project air pollutants associated with the HAP benzene (C₆H₆) prior to the issuance of construction permits.

Timing/Implementation: Prior to the issuance of construction permits

Enforcement/Monitoring: Imperial County Planning and Development Services Department

Because the applicant is revising their air permit application for the proposed project for a synthetic minor source status, implementation of mitigation measure **MM 4.3.5** would reduce this impact to a level that is considered **less than significant**. Because the project would be required to enforce apply the federal conditions for synthetic minor source status requiring permanent,

¹ See Assessment of Potential Health Risks from Benzene and Hydrogen Sulfide Emissions from the East Brawley Regenerative Thermal Oxidizer Unit and Caustic Scrubbing System, located in **Appendix D**.

4.3 AIR QUALITY

quantifiable, and practically enforceable permit conditions including operational limitations and conditions.

Objectionable Odors Affecting a Substantial Number of People

Impact 4.3.6 Receptors located in the vicinity of the proposed project may be exposed to small amounts of odorous emissions. This impact is considered **less than significant**.

Minimal hydrogen sulfide (H₂S) emissions would be released during operation of the project power plant, as the majority of the gas would be injected back into the geothermal reservoir via the injection or blowdown wells (EMA 2010, p. 16). Air quality modeling conducted for the project shows that power plant emissions of hydrogen sulfide from the scrubber stack would not produce hydrogen sulfide concentrations in excess of the state ambient air quality (odor) standard at any occupied residence (EMA 2010, p. 16). Hydrogen sulfide would also be emitted during well drilling and flow testing. However, the concentrations of H₂S measured in the geothermal fluids in the North Brawley geothermal area are low (EMA 2010, p. 16), and H₂S emissions during drilling and flow testing would be short term and temporary (about 20 days).

Typically, only one well is drilled at a time in a geothermal wellfield, and a reasonable estimate for the maximum number of wells that could be drilled as a result of the project is one per month due to the time needed to mobilize and demobilize the necessary well-drilling equipment (Thomas 2010). As previously mentioned, a negligible to the point of unquantifiable amount of hydrogen sulfide would be released from the circulating drilling fluid during drilling activities (Thomas 2010).

The amount of hydrogen sulfide emitted to the air during flow testing would be small, because a well flow test is short in duration (EMA 2010, p. 7). Assuming that the geothermal fluid contains 70 ppm of hydrogen sulfide and that all of the hydrogen sulfide in the geothermal fluid is released to the atmosphere upon flashing (the change of fluid into steam), a well flow test conducted at rate of 500,000 pounds per hour would emit hydrogen sulfide at a rate of about 35 pounds per hour (EMA 2010, p. 7). Only one well is typically flow tested at a time (Thomas 2010).

The tertiary treatment of wastewater includes injection of sodium hypochlorite into the effluent pump to maintain residual disinfectant. This would result in a beneficial effect of eliminating residual odor from organic wastes from the existing discharge of secondary treated wastewater into the New River. This impact is **less than significant**.

Mitigation Measures

None required.

4.3.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for air quality is the SSAB, which consists of all of Imperial County and a portion of Riverside County, including existing, approved, proposed, and reasonably foreseeable development within the air basin. Regional air quality in the SSAB is affected by topography and atmospheric inversions. The area is generally very flat and bordered to the west by the Peninsular Mountain range and to the east by the Chocolate, Orocopia, and Cargo Muchacho mountains. The prevailing winds tend to come from the west-northwest through

southwest. The mountains to the east act as physical barriers to the dispersion of airborne contaminants. At current levels of development and activity, the air basin exceeds the state and federal ambient standards for PM₁₀ and ozone. Cumulative growth in Imperial County and the SSAB would increase population, vehicle use, and industrial activity, which could inhibit efforts to improve regional air quality and attain ambient air quality standards.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Air Quality

Impact 4.3.7 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would contribute to increased air quality emissions in the air basin. This is considered a **potentially cumulatively considerable** impact.

As discussed under Impact 4.3.3, the project would result in an increase of regulated air pollutants associated with ozone or PM₁₀ in excess of 137 pounds per day. As depicted in **Table 4.2-7**, the power plant would emit 29.64 tons per year (161 pounds per day) of ROCs, which is in excess of 137 pounds per day, so offsets would be required for these excess project emissions at a rate of 1.2 to 1.0. Mitigation measure **MM 4.3.3a** mandates the implementation of a regenerative thermal oxidizer (RTO) unit and caustic scrubber system as well as a maintenance vapor recovery unit to limit OEC unit emissions as part of the proposed project. The RTO unit would remove by thermal oxidation essentially all of the ammonia and a minimum of 98 percent of the methane (CH₄), benzene (C₆H₆), and hydrogen sulfide (H₂S) in the geothermal NCG delivered to the RTO unit (EMA 2010, p. 7). Mitigation measure **MM 4.3.3b** requires the proposed project to fulfill its obligations mandated in ICAPCD Rule 207.C.2.a in order to mitigate project air pollutants associated with ozone or PM₁₀ in excess of 137 pounds per day with the purchase of necessary ROC emission offset credits from one or more entities. Implementation of mitigation measure **MM 4.3.3b** would reduce the net emissions of ROCs in the Salton Sea Air Basin (EMA 2010, p. 12).

As discussed under Impact 4.3.5, without the proposed RTO/scrubber emission abatement, the proposed project has the potential to emit more than 10 tons per year of the HAP benzene. Pursuant to Rule 900 of ICAPCD, the project would be considered a major stationary source unless the abatement of benzene is federally enforceable. This impact would be **less than cumulatively considerable with mitigation**.

Mitigation Measures

No additional mitigation is required. Implementation of mitigation measure **MM 4.3.5** mandates the achievement of synthetic minor source status in order to mitigate project air pollutants associated with benzene (prior to the issuance of construction permits). Therefore, the proposed project's cumulative impact to air quality from operational emissions is considered **less than cumulatively considerable**.

4.3 AIR QUALITY

REFERENCES

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4.4 BIOLOGICAL AND NATURAL RESOURCES

4.4 BIOLOGICAL AND NATURAL RESOURCES

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) evaluates the biological resource impacts associated with the proposed East Brawley Geothermal Development project and identifies mitigation measures necessary to reduce potentially significant impacts, where feasible. Information contained in this section is based on a review of database search results pertaining to biological resources within the project site and on field investigations. The biological resources within the project site were determined from a review of previous environmental documentation for the project site including the County of Imperial General Plan (County of Imperial 2008), a biological resource assessment prepared by Barrett's Biological Surveys (Barrett's Biological Surveys 2010; **Appendix E1**), and ORMAT'S Environmental Assessment of East Brawley Geothermal Development Project's (EBGDP) Potential Impact to IID Drains & Salton Sea (December 2009, **Appendix F**). A number of other resources were used for this evaluation, including an online list of federally listed species for the project vicinity provided by the U.S. Fish and Wildlife Service (USFWS) Endangered Species Office (USFWS 2010), the California Department of Fish and Game's California Natural Diversity Database (CNDDDB) (CDFG 2010), and the California Native Plant Society's (CNPS) Electronic Inventory (CNPS 2010) for the Wiest, California, U.S. Geological Survey (USGS 1957) 7.5-minute quadrangle and surrounding quadrangles. Methods are further described in subsection 4.4.3 below.

4.4.1 EXISTING SETTING

REGIONAL SETTING

Imperial County

Historically, the Imperial Valley was part of the natural Colorado Desert habitat, but the introduction of irrigated agriculture has dramatically altered the natural wildlife setting. Generally, few species native to the Colorado Desert habitat occur in the cultivated portions of Imperial Valley. However, the dominant plant community in the region has been creosote bush scrub, which still occurs on the East and West Mesas outside of the irrigated valley. Imperial Valley is also a large agricultural community. The dominant crops cultivated in the Imperial Valley include alfalfa, lettuce, carrots, melons, sugar beets, onions, wheat and other grains, and citrus crops.

Imperial County is located on the important Pacific flyway corridor for migrant waterfowl, shorebirds, and songbirds. The extensive irrigation system in the region attracts many bird species that associate with agricultural fields, canals, drains, and the Salton Sea. The desert scrub habitats around the irrigated valley contribute an enormous diversity of bird species that may occur in the project area. Bird species that are associated with agricultural areas include waterfowl, gulls, herons, cranes, ibises, egrets, doves, quail, sparrows, finches, and juncos. Raptors occurring in agricultural areas include the marsh hawk (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), and western burrowing owl (*Athene cunicularia hypugea*).

Rodents and other small mammals (western harvest mouse [*Reithrodontomys megalotis*], house mouse [*Mus musculus*], Norway rat [*Rattus norvegicus*], valley pocket gopher [*Thomomys bottae*], brush rabbit [*Sylvilagus bachmani*], striped skunk [*Mephitis mephitis*], raccoon [*Procyon lotor*], and muskrat [*Ondatra zibethicus*]) utilize marginal habitats along the canals, drains, and roadsides. The surrounding desert provides habitat for other rodent species as well as the larger mammalian species (i.e., jackrabbit [*Lepus californicus*], mule deer [*Odocoileus hemionus*], wild burro [*Equus asinus*], gray fox [*Urocyon cinereoargenteus*], coyote [*Canis latrans*], bobcat [*Lynx rufus*], and mountain lion [*Puma concolor*]). Reptilian species typically associated with the Colorado Desert may occur in the Imperial Valley agricultural areas.

4.4 BIOLOGICAL AND NATURAL RESOURCES

Salton Sea

The Salton Sea is a critical component of the habitat base that currently sustains migratory birds of the Pacific Flyway, a major north-south route of travel for migratory birds in the Americas, extending from Alaska to Patagonia. Wetlands loss within California exceed 90 percent of the acreage present at the time of statehood and is one of the reasons why the Salton Sea has become an important wintering and staging area for migratory birds. Populations of up to 1.5 million eared grebes have been documented at the sea during recent years along with up to one-half of California's wintering white-faced ibis, tens of thousands of shorebirds, waterfowl, and white pelicans. Nearly 40 percent of the nesting black skimmers in California are found at the sea along with significant breeding colonies of double-crested cormorants and Caspian terns and the largest breeding population of gull-billed terns in western North America. In total, more than 380 species of birds have been recorded at the Sonny Bono Salton Sea National Wildlife Refuge, the largest number of species found on any national wildlife refuge in the west. Endangered species are also prominent at the sea. A significant portion of the Yuma clapper rail population is dependent upon the sea and drains that feed the sea. Desert pupfish are another prominent species present, as are endangered California brown pelicans.

LOCAL SETTING

The project site consists of generally flat terrain with very gentle topography sloping toward the northwest. The East Brawley Geothermal Development project site is relatively level at an elevation of about 142 feet below mean sea level (msl). A majority of the project site is under active cultivation with agricultural crops and contains canals and irrigation drains that are used to transport water to and from the agricultural resources located within the project site.

Climate within the project site is characterized as hot and arid (USDA 1997). During the winter months, temperatures range from an average of 41.1 degrees Fahrenheit (°F) to 71.3°F; during the summer months, temperatures range from an average of 72.8°F to 106.0°F (WRCC 2008). Average annual precipitation is 2.99 inches (WRCC 2008) and the mean freeze-free period is about 350 days (USDA 1997).

BIOLOGICAL SETTING

Biotic Communities

Because a majority of the project area is either developed or under active agricultural cultivation, native vegetation communities and naturally-occurring habitats are not found. Vegetation within and immediately surrounding the project site consists primarily of agriculture and urban communities that are bordered by irrigation and canal systems. These communities, and their associated wildlife species, are described below.

Agriculture

Agricultural areas occur on a variety of land types throughout California. This is the primary biotic community throughout the project area. For the purposes of this community description, the agricultural biological community includes field crops. Presently, crops grown in the project site include alfalfa and hay. Typically, agricultural fields in California are monotypic; however, trees are sometimes planted as windbreaks at field edges and some ruderal (weedy) vegetation can be found along roadsides, at field edges, and between rows.

Typically, agricultural lands can transition into any community or habitat type. In the project area, agricultural lands are associated with urban areas. Transitions between habitats are generally abrupt, marking the edge of cultivated areas. Because of their high degree of disturbance, agricultural areas generally have a low habitat value for wildlife, although a number of species adapted for disturbed conditions can utilize these areas. Field crops and pastures can provide food and cover for squirrels, numerous birds, raccoons, feral pigs (*Sus scrofa*), ring-necked pheasant (*Phasianus colchicus*), American crow (*Corvus brachyrhynchos*), coyotes, and striped skunk. Seasonally flooded pastures and fields can provide important habitat for migratory waterfowl.

Urban

This community typically includes residential and commercial landscaping materials. Lawns, shrubs, and trees of various size, density, and arrangement are found adjacent to the project site. A distinguishing characteristic of urban habitats is the mixture of native and exotic plant species. Also included in the urban designation are ruderal communities that occur in areas of disturbances such as along roadsides and sidewalks. These communities are subjected to ongoing or past disturbances (e.g., vehicle activities and mowing). Areas of disturbance that are recolonized by invasive, non-native forb species are typically referred to as ruderal. Ruderal habitat in these disturbed areas supports a diverse weedy flora.

Common plant species observed within and adjacent to the project site include, but are not limited to, salt cedar (*Tamarix* sp.), alkali mallow (*Malvella leprosa*), prickly lettuce (*Lactuca serriola*), salt grass (*Distichlis spicata*), duckweed (*Lemna minor*), sprangletop (*Leptochloa* sp.), spurge (*Euphorbia maculata*), four-wing saltbush (*Atriplex canescens*), alkali heliotrope (*Heliotropium curassavicum*), mesquite (*Prosopis* sp.), oleander (*Nerium oleander*), Mexican palo verde (*Parkinsonia aculeata*), cattail (*Typha* sp.), nutsedge (*Cyperus* sp.), Mexican fan palm (*Washingtonia robusta*), cottonwood (*Populus* sp.), and blue-gum eucalyptus (*Eucalyptus globulus*).

Native and introduced wildlife species that are tolerant of human activities often thrive in urban communities. Wildlife species that occur in these areas typically include introduced species adapted to human habitation, including rock pigeon (*Columba livia*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and house mouse. Native species typically include common raven (*Corvus corax*), common barn owl (*Tyto alba*), red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), Brewer's blackbird (*Euphagus cyanocephalus*), and house finch (*Carpodacus mexicanus*). Animals observed within the project site include common raven, killdeer (*Charadrius vociferus*), cattle egret (*Bubulcus ibis*), green heron (*Butorides virescens*), mourning dove (*Zenaida macroura*), roadrunner (*Geococcyx californianus*), turkey vulture (*Cathartes aura*), desert cottontail (*Sylvilagus audubonii*), and common sulphur butterfly (*Colias philodice*).

Irrigation Ditches/Canals

Multiple irrigation canals and drainage ditches course through the project area. These waterways support riparian and freshwater marsh habitats. Characteristic wetland species that occur in these habitats include willows (*Salix* sp.), western cottonwood (*Populus fremontii*), mesquite, velvet ash (*Fraxinus velutina*), and salt cedar, and various sedges, rushes, and other wetland species. These species provide habitat for a broad range of native, introduced, and migrant wildlife species. Some species have benefited by the availability of irrigation water during the drier summer months. A unique aquatic habitat has developed in the canal system inhabited predominantly by introduced fish species. Other wildlife species that may be found

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within these systems include the Yuma clapper rail (*Rallus longirostris yumanensis*) and white-face ibis (*Plegadis chihi*), among others.

Sensitive Habitats

Sensitive habitats include areas of special concern to resource agencies, areas protected under the California Environmental Quality Act (CEQA), areas designated as sensitive natural communities by the California Department of Fish and Game (CDFG), areas outlined in Section 1600 of the California Fish and Game Code, areas regulated under Section 404 of the federal Clean Water Act (CWA), areas protected under Section 402 of the CWA, and areas protected under local regulations and policies. Some of the cover types found on the project site are sensitive habitats protected by various agencies. The riverine and riparian habitats within the project site are sensitive habitats under the jurisdiction of the CDFG and the U.S. Army Corps of Engineers (USACE).

River

The New River is a tributary of the Salton Sea, located in the southern tip of California and occupying the northern part of the Salton Trough. Vegetation within the project area consists of a perimeter of mostly salt cedar. The New River is heavily polluted and offers marginal wildlife habitat opportunities.

Special-Status Species

Special-status plant and animal species are those that are afforded special recognition by federal, state, or local resource agencies or organizations. Special-status species are of relatively limited distribution and generally require specialized habitat conditions. Special-status species are defined as:

- Listed, proposed, or candidate for listing under the state or federal Endangered Species Acts;
- Protected under other regulations (e.g., local policies, Migratory Bird Treaty Act);
- California Department of Fish Game's Species of Special Concern and California Fully Protected Species;
- Listed as species of concern (List 1B, 2, or 3 plants) by California Native Plant Society; or
- Species that receive consideration during environmental review under the CEQA.

The potential for special-status species to occur within the project site was evaluated by querying the CNDDDB (CDFG 2010), the USFWS (2010), and the CNPS (2010) for previously recorded occurrences of special-status species within the Wiest, California, USGS 7.5-minute quadrangle (USGS 1957) and eight surrounding quadrangles (Holtville NE, Alamorio, Westmorland, Niland, Brawley, Amos, Tortuga, and Iris).

CDFG maintains records for the distribution and known occurrences of sensitive species and habitats in the CNDDDB. The CNDDDB is organized into map areas based on 7.5-minute topographic maps produced by the U.S. Geological Survey. The CNDDDB is based on actual recorded occurrences, but does not constitute an exhaustive inventory of every resource. The absence of an occurrence in a particular location does not necessarily mean that special-status

species are absent from that area, but that no data has been entered into the CNDDDB inventory. Detailed field surveys are generally required to provide a conclusive determination on presence or absence of sensitive resources from a particular location where there is evidence of potential occurrence.

Figure 4.4-1 depicts the locations of special-status species recorded in the CNDDDB within a 1-mile radius of the project site. Table 4.4-1 and Table 4.4-2 below identify the special-status species plant and animal species, respectively, which have potential to be affected by projects occurring in the project vicinity. The habitat preferences for each special-status species were carefully reviewed and considered in the context of each project site and surrounding areas. Species having no potential for occurrence are not expected to occur based on the known elevation or distribution range of the species or the lack of suitable habitat. Species that do have potential for occurrence are described in more detail below.

Special-Status Plants

Due to the developed and maintained nature of the project site, no special-status plant species from Table 4.4-1 below have the potential to occur on or in the immediate vicinity of the project site. The CNDDDB (CDFG 2010) identified the occurrence of one special-status plant, Abrams’ spurge (*Chamaesyce abramsiana*), within 1 mile of the project site (Figure 4.4-1); however, the project site does not contain suitable habitat to support this species. The table includes the common name and scientific name for each species, regulatory status (federal, state, local, CNPS), habitat descriptions, plant species identification period, and potential for occurrence within the project site.

**TABLE 4.4-1
SPECIAL-STATUS PLANT SPECIES POTENTIALLY OCCURRING WITHIN THE PROJECT SITE**

Scientific Name Common Name	Status			Habitat Description ⁴	Considered in Impact Analysis	Rationale
	Federal ¹	State ²	CNPS ³			
<i>Abronia villosa</i> var. <i>aurita</i> Chaparral sand- verbena	~	~	1B.1	Annual herb in the Nyctaginaceae family. Found in chaparral, coastal scrub, desert dunes in sandy soils. Blooming period: January – September Elevation: 80 – 1,600 meters	No	Project site highly disturbed – does not provide suitable habitat.
<i>Astragalus</i> <i>magalena</i> var. <i>peirsonii</i> Peirson’s milk- vetch	FT	SE	1B.2	Perennial herb in the Fabaceae family. Found in desert dunes. Known in California from fewer than 5 occurrences. One location in Anza-Borrego does not appear to be a naturally occurring population; DNA analysis pending. Blooming period: December – April Elevation: -55 – 250 meters	No	No suitable habitat within project site.

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Scientific Name Common Name	Status			Habitat Description ⁴	Considered in Impact Analysis	Rationale
	Federal ¹	State ²	CNPS ³			
<i>Chamaesyce abramsiana</i> Abrams' spurge	~	~	2.2	Annual herb in the Euphorbiaceae family. Found in Mojavean desert scrub, Sonoran desert scrub in sandy soils. Blooming period: September – November Elevation: -5 – 915 meters	No	Project site highly disturbed – does not provide suitable habitat. Recorded occurrence within 1 mile of project site.
<i>Croton wigginsii</i> Wiggins' croton	~	CR	2.2	Perennial shrub in the Euphorbiaceae family. Found in desert dunes, Sonoran desert scrub. Known in California from only 2 occurrences. Blooming period: March – May Elevation: 50 – 100 meters	No	No suitable habitat within project site.
<i>Cylindropuntia minzii</i> Munz's cholla	~	~	1B.3	Succulent with a perennial stem in the cactus family (Cactaceae). Found in Sonoran desert scrub (sandy or gravelly). Known from only two occurrences in the Chocolate Mountains. Of hybrid origin, but stabilized; only reproducing vegetatively. Blooming period: May Elevation: 150 – 600 meters	No	No suitable habitat within project site.
<i>Ditaxis claryana</i> Glandular ditaxis	~	~	2.2	Perennial herb in the Euphorbiaceae family. Found in Mojavean desert scrub, Sonoran desert scrub in sandy soils. Blooming period: October – March Elevation: 0 – 465 meters	No	No suitable habitat within project site.
<i>Helianthus niveus</i> ssp. <i>tephrodes</i> Algodones Dunes sunflower	~	SE	1B.2	Perennial herb in the sunflower family (Asteraceae). Found in desert dunes. Blooming period: September – May Elevation : 50 – 100 meters	No	No suitable habitat within project site.

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Scientific Name Common Name	Status			Habitat Description ⁴	Considered in Impact Analysis	Rationale
	Federal ¹	State ²	CNPS ³			
<i>Nemacalulis denudate</i> var. <i>gracilis</i> Slender woolyheads	~	~	2.2	Annual herb in the Polygonaceae family. Found in coastal dunes, desert dunes, and Sonoran desert scrub. Blooming period: (March), April – May Elevation: -50 – 400 meters	No	No suitable habitat within project site.
<i>Palafoxia arida</i> var. <i>gigantea</i> Giant Spanish-needle	~	~	1B.3	Annual/perennial herb in the sunflower family (Asteraceae). Found in desert dunes. Blooming period: February – May Elevation: 15 – 100 meters	No	No suitable habitat within project site.
<i>Pholisma sonorae</i> Sand food	~	~	1B.2	Parasitic perennial herb in the Lennoaceae family. Found in desert dunes. Blooming period: April – June Elevation: 0 – 200 meters	No	Project site does not provide suitable habitat.

Source: CNPS 2010; USFWS 2010; CDFG 2010

CODE DESIGNATIONS

1. Federal status: USFWS Listing	2. State status: CDFG Listing	3. CNPS: CNPS Listing
FT = Listed as threatened under the federal Endangered Species Act	SE = Listed as endangered under the California Endangered Species Act	1B = Plant species that are rare, threatened, or endangered in California and elsewhere.
	CR = Species identified as rare by CDFG	List 2 = Plant species that are rare, threatened, or endangered in California, but more common elsewhere.
4. Habitat description: Habitat description adapted from CNPS online inventory (CNPS 2010)		Threat Ranks 0.1 – Seriously threatened in California (high degree/immediacy of threat) 0.2 – Fairly threatened in California (moderate degree/immediacy of threat) 0.3 – Not very threatened in California (low degree/immediacy of threats or no current threats known)

Special-Status Wildlife

Seven special-status wildlife species identified in **Table 4.4-2** below have the potential to occur in the project site including western burrowing owl, mountain plover (*Charadrius montanus*), yellow warbler (*Dendroica petechia*), southwestern willow flycatcher (*Empidonax traillii extimus*), white-faced ibis, Crissal thrasher (*Toxostoma crissale*), and American badger (*Taxidea taxus*). The CNDDDB (CDFG 2010) identified the occurrence of special-status wildlife species, the Yuma clapper rail, within 1 mile of the project site (**Figure 4.4-1**); however, the project site does not

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contain suitable habitat to support the Yuma clapper rail due to the lack of dense cattails (*Typha* sp.) or Phragmites (*Phragmites* sp.) (Barrett's Biological Surveys 2010, p. 15). **Table 4.4-2** includes the common name and scientific name for each species, regulatory status (federal, state), habitat descriptions, and potential for occurrence within the project area.

**TABLE 4.4-2
SPECIAL-STATUS WILDLIFE SPECIES POTENTIALLY OCCURRING WITHIN THE PROJECT SITE**

Scientific Name Common Name	Status		Habitat Description ³	Considered in Impact Analysis	Rationale
	Federal ¹	State ²			
Fish					
<i>Cyprinodon macularius</i> Desert pupfish	FE	SE	Desert springs and outflow marshes, river-edge marshes, backwaters, saline pools, and streams. Original habitat probably was marshes and floodplain pools along the lower Colorado River and springs throughout the Salton Sink. Prefers areas with sand/silt substrates and aquatic plant life, limited surface flow, water less than one meter in depth. Tolerates low oxygen levels, high temperatures, and high salinity. May forage in shallows in early morning, deeper water most of day. Often rests on bottom, especially at night. May dive into anoxic bottom mud. Eggs are laid on substrate of sand, mud, or perhaps preferentially on algal mat. Currently, desert pupfish distribution in California is confined to two natural tributaries to the Salton Sea: San Felipe and Salt creeks with their associated wetlands; some shoreline pools of the sea, and a majority of the irrigation drains leading into the sea. Introduced populations remain in ten artificial pond refuges.	No	No suitable habitat within project site. Also, project site outside known distribution range of this species. No recorded occurrences within 5 miles of project site.
<i>Gila elegans</i> Bonytail chub	FE	SE	Found in the Colorado River bordering California. Adapted for swimming in swift water, both adults and young need backwaters and eddies. Needs gravel riffles for spawning (CDFG 2010). Bonytail chub prefer backwaters with rocky or muddy bottoms and flowing pools, although they have been reported in swiftly moving water. They are mostly restricted to rocky canyons today, but were historically	No	No suitable habitat within project site. Also, project site outside known distribution range of this species. No recorded occurrences within 5 miles of project site.

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Scientific Name Common Name	Status		Habitat Description ³	Considered in Impact Analysis	Rationale
	Federal ¹	State ²			
			abundant in the wide downstream sections of rivers.		
<i>Ptychocheilus lucius</i> Colorado squawfish	FE	SE	Native to the Colorado River bordering California. The species was once found throughout the Colorado basin, so occurred in Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming, as well as in Mexico. Adults found in deep pools in the main river channel, smaller fish are found in shallow and quiet waters. Their usual habitat is the backwaters of the turbulent and turbid rivers that make up the Colorado system (CDFG 2010).	No	No suitable habitat within project site. Also, project site outside known distribution range of this species. No recorded occurrences within 5 miles of project site.
<i>Xyrauchen texanus</i> Razorback sucker	FE	SE	Native to the Colorado River bordering California. Adapted for swimming in swift currents but also need quiet waters. Spawn in areas of sand, gravel, rocks in shallow water (CDFG 2010). The species originally occurred throughout the medium-sized and large rivers of the Colorado basin, but its range has shrunk to the river above the Grand Canyon, and to Lake Mead, Lake Mohave, and Lake Havasu on the lower part of the river.	No	No suitable habitat within project site. Also, project site outside known distribution range of this species. No recorded occurrences within 5 miles of project site.
Amphibians					
<i>Incilius alvarius</i> Sonoran desert toad	~	CSC	Inhabits grasslands, arid desert lowlands, mountain canyons with oaks and sycamores, and pinyon-oak-juniper mountain forests. Found in washes, river bottoms, springs, reservoirs, canals, irrigation ditches, streams, temporary pools, and away from water. From sea level to 5,700 ft. (1,760 m.). Formerly found in extreme southeast California along the lower Colorado River and in irrigated lowlands of the southern Imperial Valley. Outside California, found in southern Arizona, extreme southwest New Mexico, and in Sonora and northwest Sinaloa, Mexico (CaliforniaHerps 2010).	No	Project site does not provide suitable habitat.

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Scientific Name Common Name	Status		Habitat Description ³	Considered in Impact Analysis	Rationale
	Federal ¹	State ²			
<i>Rana (Lithobates) yavapaiensis</i> Lowland (=Yavapai & San Felipe) leopard frog	~	CSC	It is presumed to be extirpated from California. This species preferably inhabits rocky streams in canyon habitats surrounded by conifer forests or ponds and stream pools, usually in areas of scrub desert. Eggs and larvae develop in quiet water.	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.
Reptiles					
<i>Gopherus agassizii</i> Desert tortoise	FT	ST	Egg-laying occurs mainly from May to early July. Desert, shrubland/chaparral. Almost entirely confined to warm creosote bush (<i>Larrea tridentata</i>). In the Mojave Desert, the tortoise occurs in creosote scrub, creosote bursage (<i>Ambrosia dumosa</i>), shadscale (<i>Atriplex</i> sp.) scrub, Joshua tree (<i>Yucca brevifolia</i>) park, and more rarely (in the northern periphery of their range), in mixed blackbush scrub between 3,500 and 5,000 feet elevation. Often native desert grasses, especially galleta (<i>Hilaria/Plueraphis</i> sp.) and indian rice grass are associated with high tortoise densities, and the former species provides significant forage for adults. Exotic Mediterranean weed grasses (<i>Schizmus</i> and <i>Bromus</i> sp.) are abundant across the Mojave Desert. Most often tortoise habitats are associated with well-drained sandy loam soils in plains, alluvial fans, and bajadas, though tortoises occasionally occur in dunes, edges of basaltic flow and other rock outcrops, and in well-drained and vegetated alkali flats. Tortoises are often subterranean when inactive, which is about 98% of their total life span. Typically, they utilize and/or excavate shelters of four different types: burrows, dens, pallets, and non-burrows.	Project site highly disturbed – does not provide suitable habitat.	Project site highly disturbed – does not provide suitable habitat.

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Scientific Name Common Name	Status		Habitat Description ³	Considered in Impact Analysis	Rationale
	Federal ¹	State ²			
<i>Phrynosoma mcallii</i> Flat-tailed horned lizard	Proposed T	CSC	The flat-tailed horned lizard is more commonly found below 250 meters (820 feet) in areas with flat to modest slopes. Typical habitat consists of sandy desert flatlands with sparse vegetation and low plant species diversity; occasionally the species occurs on low hills, mud hills, alkali flats, or areas covered with small pebbles or desert pavement; it is most abundant where surface soils contain some loose or windblown sand but rarely occurs on dunes. Vegetation in favorable habitat may include creosote bush, bur-sage, indigo bush, saltbush, and ocotillo; also saltcedar. In southeastern California, abundance is positively correlated with density of perennial plants, and there is a strong positive association between lizard and ant densities. This is a cryptic lizard that generally occurs on the ground; often it is immobile and difficult to detect until it moves. Periods of inactivity may be spent burrowed in loose sand.	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.
Birds					
<i>Asio flammeus</i> Short-eared owl	MNBMC	CSC	An uncommon winter migrant in southern California. Broad expanses of open land with low vegetation such as grasslands, prairie, salt marshes, estuaries, mountain meadows, and alpine and Arctic tundra for nesting and foraging are required. Communal roosts occur in old-growth fields, along thick hedgerows, in overgrown rubble in abandoned fields, or in clumps of dense conifers. These owls tend to roost in trees only when snow covers the ground. During migration, short-eared owls will move through high mountain passes, flying at great heights. Tends to avoid inhabited areas.	No	No suitable habitat within the project area for this species. No recorded occurrences within 5 miles of project site.

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Scientific Name Common Name	Status		Habitat Description ³	Considered in Impact Analysis	Rationale
	Federal ¹	State ²			
<i>Athene cunicularia hypugaea</i> Western burrowing owl	MNBMC	CSC	Lives in dry, open areas with no trees and short grass (grasslands and shrublands) up to 5,300 feet with low perches and small mammal burrows. Found on golf courses, cemeteries, airports, vacant lots, university campuses, pastures, and prairie dog towns. It hunts by walking, hopping, or running along the ground, or by flying from a low perch. They nest in burrows, often dug by a mammal, typically ground squirrels. Burrow can be several meters long, with numerous twists and turns. Resident year-round. Breeds March to August.	Yes	Marginally suitable nesting habitat is present within project site along canal/ditch banks and dirt roadways.
<i>Buteo regalis</i> Ferruginous hawk	MNBMC	CSC	Ferruginous hawks are birds of open country. They are found in open habitats, such as grasslands, sagebrush, deserts, shrublands, and outer edges of pinyon-pine and other forests. They select rocky outcrops, hillsides, rock pinnacles, or trees for nest sites.	No	There is no nesting habitat within project site. Nesting within trees adjacent to project site unlikely due to the level of human disturbance in the area. Furthermore, due to the level of human disturbance in the area, this species is unlikely to forage within project site. Occurrences recorded within 5 miles of project site.
<i>Charadrius montanus</i> Mountain plover	MNBMC	CSC	Non-breeding habitat in California. Preferred habitat consists of short-grass plains and fields, plowed fields and sandy deserts, and commercial sod farms. In southern California, wintering birds preferred heavily grazed native rangelands; they used burned fields primarily for night roosting. Alkali flats were the most favored habitat, where available; the use of cultivated land may be a result of loss of native habitats; native habitats may be critical in fall before freshly cultivated fields become available.	Yes	Foraging habitat is present within the agricultural fields within and surrounding the project site. No recorded occurrences within 5 miles of project site.

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Scientific Name Common Name	Status		Habitat Description ³	Considered in Impact Analysis	Rationale
	Federal ¹	State ²			
<i>Coccyzus americanus</i> Yellow-billed cuckoo	FC; MNBMC	SE	California breeding range is restricted to the Sacramento Valley, the South Fork of the Kern River, the Lower Colorado River Valley, and sometimes the Prado Basin in Riverside and San Bernardino counties. Most recent Sacramento Valley records are from the Sacramento River from Todd Island in Tehama County south to Colusa State Park in Colusa County; the Feather River in Yuba and Sutter counties. Breed in broad, well-developed, low-elevation riparian woodlands. Egg-laying occurs from mid-June to mid-July.	No	No suitable habitat within project site. Habitat along the New River is restricted to salt cedar and is not habitat for this species.
<i>Dendroica petechia</i> Yellow warbler	MNBMC	CSC	Winters in Imperial and Colorado river valleys. Found in riparian deciduous habitats in summer: cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland. In migration, visits woodland, forest, and shrub habitats.	Yes	Marginal habitat along the New River crossing where salt cedar occurs.
<i>Empidonax traillii extimus</i> Southwestern willow flycatcher	FE; MNBMC	SE	Inhabits wet meadow and riparian montane habitats nesting in dense willow and riparian vegetation typically 2,000–8,000 feet in elevation. Peak egg-laying occurs in June. This species breeds in dense riparian habitats along rivers, streams, or other wetlands. The vegetation can be dominated by dense growths of willows (<i>Salix</i> sp.), seepwillow (<i>Baccharis</i> sp.), or other shrubs and medium-sized trees. There may be an overstory of cottonwood (<i>Populus</i> sp.), tamarisk (<i>Tamarix</i> sp.), or other large trees, but this is not always the case. In some areas, the flycatcher will nest in habitats dominated by tamarisk and Russian olive (<i>Eleagnus angustifolia</i>). One of the most important characteristics of the habitat appears to be the presence of dense vegetation, usually throughout all vegetation layers present. Almost all flycatcher breeding habitats are	Yes	Marginal habitat along the New River crossing where salt cedar occurs.

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Scientific Name Common Name	Status		Habitat Description ³	Considered in Impact Analysis	Rationale
	Federal ¹	State ²			
			within close proximity (less than 20 yards) of water or very saturated soil. This water may be in the form of large rivers, smaller streams, springs, or marshes.		
<i>Gelochelidon nilotic</i> Gull-billed tern	MNBMC	CSC	Occurs primarily as a summer resident, arriving early to mid-March and departing by mid-September; breeds from mid-April to late July (Shuford and Gardali 2008). In California, this species requires isolated nesting habitat, including small, bare islets of fine clay within impoundments at the Salton Sea or isolated sections of earthen levees at the salt works in south San Diego Bay. Vegetation, when present, is sparse. Unlike the California least tern (<i>Sternula antillarum browni</i>), but similar to other species of terns breeding in the state, it does not use beach strand, dune, or other shoreline habitats for nesting. Colonies are usually associated with shallow wetland areas and bays (Shuford and Gardali 2008).	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.
<i>Haliaeetus leucocephalus</i> Bald eagle	FD; MNBMC; Bald and Golden Eagle Protection Act	SE; CFP	Permanent resident, and uncommon winter migrant, now restricted to breeding mostly in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity counties. Ocean shore, lake margins, and rivers, both nesting and wintering. Build stick nests within large tall trees and typically within 1 mile of permanent water. Wintering populations along major rivers and reservoirs in Yuba County. Breeds February to July.	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.
<i>Latherallus jamaicensis coturniculus</i> California black rail	~	ST; CFP	Wetlands, marshes, thickets with recent sightings in near oak foothill woodlands in eastern Yuba County. Nests with eggs have been documented from March to June.	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.
<i>Melanerpes uropygialis</i> Gila woodpecker	MNBMC	SE	Breeds throughout arid regions of southwestern U.S. and northwestern Mexico in arid lowland scrub, arid montane scrub, tropical deciduous forest, gallery forest, second-growth scrub, and secondary forest. In	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.

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Scientific Name Common Name	Status		Habitat Description ³	Considered in Impact Analysis	Rationale
	Federal ¹	State ²			
			California, found in riparian woodlands, cottonwood groves, parklands and residential neighborhoods that have tall trees all year round. Also found in orchard-vineyard and urban habitats, particularly in shade trees and date palm groves. In otherwise suitable areas in southeastern California, availability of excavatable tree trunks for nesting seems to be the primary factor determining presence of this woodpecker.		
<i>Pelecanus occidentalis californicus</i> California brown pelican	FD; MNBMC	SE	(Nesting colony) Colonial nester on coastal islands just outside the surf line; nests on coastal islands of small to moderate size which afford immunity from attack by ground-dwelling predators.	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.
<i>Plegadis chihi</i> White-faced ibis	MNBMC	~	Project site within winter range, which extends from southern California and Louisiana south to include the rest of its breeding range. Prefers to feed in fresh emergent wetland, shallow lacustrine waters, muddy ground of wet meadows, and irrigated or flooded pastures and croplands. Its breeding range extends from the western USA south through Mexico, as well as from southeastern Brazil and southeastern Bolivia south to central Argentina, and along the coast of central Chile. Breeds colonially in marshes, usually nesting in bushes or low trees.	Yes	This species was observed in nearby areas. No nesting habitat, but marginal foraging habitat within the agricultural fields of project site. No recorded occurrences within 5 miles of project site.
<i>Rallus longirostris yumanensis</i> Yuma clapper rail	FE; MNBMC	ST	Freshwater marshes containing dense stands of cattails (<i>Typha</i> spp.) and bulrushes (<i>Scirpus</i> spp.). Prefers mature stands along margins of shallow ponds with stable water levels. Generally in freshwater and alkali marshes dominated by stands of emergent vegetation interspersed with areas of open water and drier, upland benches. Nests probably on dry hummocks (small natural mound) or in small shrubs among dense cattails or bulrushes along the edges of shallow ponds in freshwater marshes with stable water levels.	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.

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Scientific Name Common Name	Status		Habitat Description ³	Considered in Impact Analysis	Rationale
	Federal ¹	State ²			
<i>Rynchops niger</i> Black skimmer	MNBMC	CSC	The black skimmer breeds in loose groups on gravel bars, low islets, and sandy beaches, in unvegetated sites. Nesting colonies are usually less than 200 pairs. The chicks leave the nest as soon as they hatch and lie inconspicuously in the nest depression or "scrape" where they are shaded from high temperatures by the parents. They may dig their own depressions in the sand at times. Parents feed the young almost exclusively during the day with almost no feeding occurring at night, due to the entire population of adults sometimes departing the colony to forage.	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.
<i>Sternula antillarum browni</i> California least tern	FE; MNBMC	SE	Summer/nesting in Bay Area; isolated colony in San Francisco Bay on sandy beaches bordering shallow water in estuaries; bulk of distribution in southern California coast. The least tern arrives at its breeding grounds in late April. The breeding colonies are not dense and may appear along either marine or estuarine shores, or on sand bar islands in large rivers, in areas free from humans or predators. Nests are situated on barren to sparsely vegetated places near water, normally on sandy or gravelly substrates.	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.
<i>Toxostoma crissale</i> Crissal thrasher	MNBMC	CSC	Found in dense, low scrubby vegetation, such as desert and foothill scrub and riparian brush. Nest consists of an open cup of twigs, lined with finer vegetation, placed in middle of dense shrub.	Yes	Suitable habitat within project site near the New River.
<i>Vireo bellii pusillus</i> Least Bell's vireo	FE; MNBMC	SE	Early to mid-successional riparian habitat is typically used for nesting by the least Bell's vireo because it supports the dense shrub cover required for nest concealment as well as a structurally diverse canopy for foraging. Vegetation characteristics of riparian stands between five to ten years of age are most suitable for nesting least Bell's vireo. Least Bell's vireos place their nests in a variety of	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.

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Scientific Name Common Name	Status		Habitat Description ³	Considered in Impact Analysis	Rationale
	Federal ¹	State ²			
			plants that provide concealment in the form of dense foliage. The most frequently used species include willows (<i>Salix</i> sp.), mulefat (<i>Baccharis glutinosa</i>), California wild rose (<i>Rosa californica</i>), poison oak (<i>Toxicodendron diversilobum</i>), mugwort (<i>Artemisia douglasiana</i>), and cottonwood (<i>Populus fremontii</i>) (Kus 2002).		
Mammals					
<i>Lasiurus xanthinus</i> Western yellow bat	~	CSC	This foliage dweller inhabits leafy vegetation (i.e., palm oases) and feeds on insects. Individuals usually roost in trees, hanging from the underside of a leaf. They are commonly found in the southwestern U.S. roosting in the skirt of dead fronds in both native and non-native palm trees. They are often found in Spanish moss. They do not migrate.	No	No suitable roosting habitat within project site; however, suitable habitat adjacent to project site.
<i>Ovis canadensis nelsoni</i> Peninsular bighorn sheep	FE	ST	Bighorn sheep have agility on steep rocky terrain, an adaptation used to escape predators. Consequently, preferred habitat is primarily on or near mountainous terrain above the desert floor that is visually open, as well as steep and rocky. Surface water is another element of desert bighorn habitat considered to be important to population health (Wehausen 2010).	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.
<i>Perognathus lonimembris pacificus</i> Pacific pocket mouse	FE	~	Inhabits the narrow coastal plains from the Mexican border north to El Segundo, Los Angeles County. Seems to prefer soils of fine alluvial sands near the ocean, but much remains to be learned. The Pacific pocket mouse was believed to be extinct for nearly 20 years until it was rediscovered in 1993.	No	No suitable habitat within project site. No recorded occurrences within 5 miles of project site.
<i>Taxidea taxus</i> American badger	~	CSC	Stout-bodied, primarily solitary species that hunts for ground squirrels and other small mammal prey in open grassland, cropland, deserts, savanna, and shrubland communities. Badgers have large home ranges and spend inactive	Yes	Suitable habitat within project site within burrows. Recorded occurrence within 5 miles of project site.

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Scientific Name Common Name	Status		Habitat Description ³	Considered in Impact Analysis	Rationale
	Federal ¹	State ²			
			periods in underground burrows. Badgers typically mate in mid- to late summer and give birth between March and April.		

Source: USFWS 2010; CDFG 2010

CODE DESIGNATIONS

1. Federal status: USFWS Listing	2. State status: CDFG Listing
ESU = Evolutionary Significant Unit is a distinctive population.	SE = Listed as endangered under the California Endangered Species Act (CESA)
FE = Listed as endangered under the federal Endangered Species Act (ESA)	ST = Listed as threatened under the CESA
FT = Listed as threatened under ESA	CSC = Species of Concern as identified by the CDFG
FC = Candidate for listing (threatened or endangered) under FESA	CFP = Listed as fully protected under CDFG code
FD = Delisted in accordance with the ESA	CR = Rare in California
FPD = Federally Proposed to be Delisted	
MNBMC = Migratory Nongame Bird of Management Concern, protected under the Migratory Bird Treaty Act	3. Habitat description: Habitat description information from the California Wildlife Habitat Relationships System maintained by the CDFG

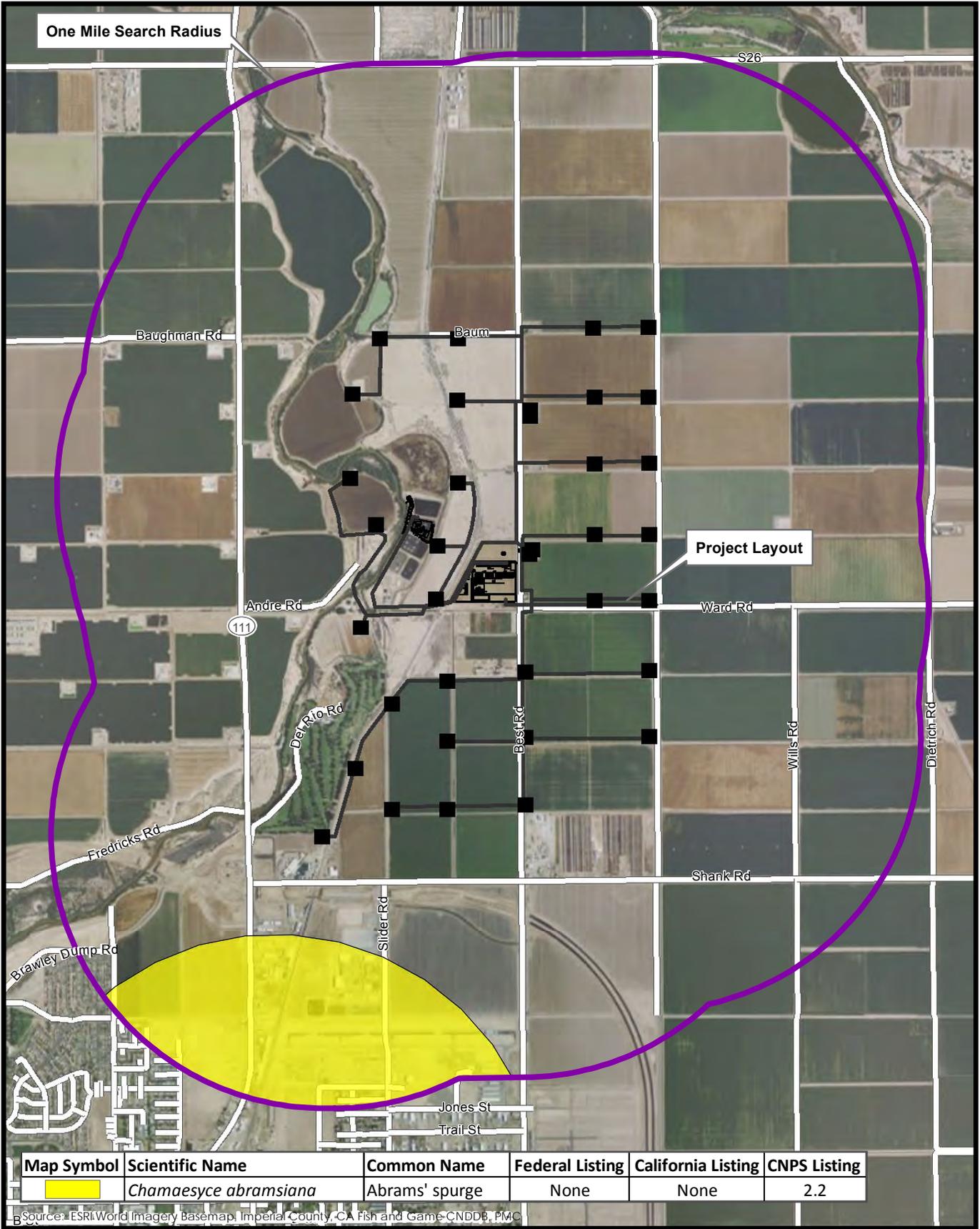


Figure 4.4-1
Recorded Occurrences of Special-status Species
Within a One Mile Radius of the Project Area

Special-Status Wildlife Species with Potential to Occur

The **western burrowing owl** is a CDFG species of special concern. It is a small, pale, buffy-brown owl that is unique in its habit of nesting in subterranean burrows. It occurs in grassland and other open habitats throughout much of the western United States, with a disjunct population in Florida. It is opportunistic in its use of burrow sites and can use pipes or other suitable cavities at or below ground level. Burrows can be up to 10 feet long, and enlarged nesting chambers are constructed at the terminus. Clutches of up to 12 eggs are laid, primarily from February to May. The agriculturally dominated area of Imperial Valley has become favored by the burrowing owl species in southern California, with recent estimates of up to 5,600 pairs. The earthen banks of the irrigation canals and drains are commonly used as nesting sites in this area. Prey items identified in the Imperial Valley include insects, spiders, earwigs, wind scorpions, isopods, and small rodents. A western burrowing owl survey was conducted on January 25 and 31, February 6, May 29 and 30, 2008, and again on July 22 and 23, 2010. No burrowing owls were observed within the eight pad sites, pipeline routes, and power plant site surveyed. In addition, no burrowing owls or burrows were found within field ditches near the sites and the Imperial Irrigation District (IID) right-of-way adjacent to the project sites within 250 feet (Barrett's Biological Survey's 2010).

The **mountain plover** is a California species of special concern and a migratory nongame bird of management concern, protected under the Migratory Bird Treaty Act (MBTA). It is a winter resident of short grasslands and plowed fields throughout California, including San Joaquin Valley, Imperial Valley, Los Angeles and San Bernardino counties, and along the Central Colorado river valley below 3,200 feet in elevation. The mountain plover avoids dense cover and feeds by searching on the ground for large insects. This species does not nest in California. The disturbed agricultural setting within the project site provides only marginal foraging habitat for this species.

The **white-faced ibis** is a migratory nongame bird of management concern, protected under the MBTA. It has no state or federal status. The white-faced ibis is an uncommon summer resident in sections of southern California and is more widespread in migration. This bird prefers to feed in fresh emergent wetland, shallow lacustrine waters, muddy ground of wet meadows, and in irrigated or flooded pastures and croplands. The disturbed agricultural setting within the study provides only marginal foraging habitat for this species.

The **yellow warbler** is a California species of special concern and its nests are protected under the MBTA. This species is found in riparian plant associations and prefers willows, cottonwoods (*Populus* spp.), aspens (*Populus tremuloides*), sycamores (*Platanus* spp.), and alders (*Alnus* spp.) for nesting and foraging. This species also nests in montane shrubbery in open conifer forests and breeds mid-April to early August. Marginal habitat for this species occurs along the New River within the dense tamarisk thickets.

The **Crissal thrasher** is a California species of special concern and its nests are protected under the MBTA. This species is found in riparian plant associations and prefers willows, cottonwoods, aspens, sycamores, and alders for nesting and foraging. Marginal habitat for this species occurs along the New River within the dense tamarisk thickets.

The **southwestern willow flycatcher** is listed as both federal and state endangered and its nests are protected under the MBTA. The southwestern willow flycatcher breeds in dense riparian habitats along rivers, streams, or other wetlands. The vegetation can be dominated by dense growths of willows, seepwillow (*Baccharis* sp.), or other shrubs and medium-sized trees. There may be an overstory of cottonwood, tamarisk, or other large trees. They make a cup nest in a

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vertical fork in a shrub or tree. Peak egg-laying occurs in June. These birds migrate to Mexico and Central America, often selecting winter habitat near water.

The **American badger** is a California species of special concern. It is a stout-bodied, primarily solitary species that hunts for ground squirrels and other small mammal prey in open grassland, cropland, deserts, savanna, and shrubland communities. Badgers have large home ranges and spend inactive periods in underground burrows. Badgers typically mate in mid- to late summer and give birth between March and April. Although there are no previously recorded occurrences within a 1-mile radius of the project site (CDFG 2010) and no large dens were observed during the field surveys, suitable habitat is present and this species may den within the project site in the future.

4.4.2 REGULATORY FRAMEWORK

This section lists specific environmental review and consultation requirements and identifies permits and approvals that must be obtained from local, state, and federal agencies prior to future construction or buildout activities within the proposed project area.

FEDERAL

Endangered Species Act

Provisions of the federal Endangered Species Act (ESA), as amended (16 USC 1531), protect federally listed threatened and endangered species and their habitats from unlawful take. "Take" under the ESA includes activities such as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." USFWS regulations define harm to include some types of "significant habitat modification or degradation." The United States Supreme Court ruled on June 29, 1995, that "harm" may include habitat modification "...where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." For projects with a federal nexus, Section 7 of the ESA requires that federal agencies, in consultation with the USFWS or the National Oceanic and Atmospheric Administration (NOAA) Fisheries, use their authorities to further the purpose of the ESA and to ensure that their actions are not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat. Section 10(a)(1)(B) allows non-federal entities to obtain permits for incidental taking of threatened or endangered species through consultation with USFWS or NOAA Fisheries.

Clean Water Act, Section 404

The objective of the Clean Water Act (CWA 1977, as amended) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Discharge of fill material into waters of the U.S., including wetlands, is regulated by the U.S. Army Corps of Engineers (USACE) under Section 404 of the federal Clean Water Act (33 USC 1251-1376). USACE regulations implementing Section 404 define waters of the U.S. to include intrastate waters, including lakes, rivers, streams, wetlands, and natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce. Wetlands are defined for regulatory purposes as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3; 40 CFR 230.3). The jurisdictional boundaries for other waters of the U.S. are identified based on the presence of an ordinary high water mark as defined in 33 CFR 328.3(e). The placement of structures in "navigable waters of the U.S." is also regulated by USACE under Section 10 of the federal Rivers

and Harbors Act (33 USC 401 et seq.). Projects are permitted under either individual or general (e.g., nationwide) permits. Specific applicability of permit type is determined by the USACE on a case-by-case basis.

In 1987, USACE published a manual that standardized the manner in which wetlands were to be delineated nationwide. To determine whether areas that appear to be wetlands are subject to USACE jurisdiction (i.e., are "jurisdictional" wetlands), a wetlands delineation must be performed. Under normal circumstances, positive indicators from three parameters, (1) wetland hydrology, (2) hydrophytic vegetation, and (3) hydric soils, must be present to classify a feature as a jurisdictional wetland. More recently, USACE developed the Arid West Regional Supplement (Supplement) (USACE 2006) for identifying wetlands and distinguishing them from aquatic habitats and other nonwetlands. The supplement presents wetland indicators, delineation guidance, and other information that is specific to the arid west region. For any wetland delineations submitted after June 5, 2007, USACE is requiring that the site be surveyed according to both the 1987 manual and the supplement guidelines. In addition to verifying wetlands for potential jurisdiction, USACE is responsible for the issuance of permits for projects that propose filling of wetlands. Any permanent loss of a jurisdictional wetland as a result of project construction activities is considered a significant impact.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements international treaties between the United States and other nations devised to protect migratory birds, their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized in the regulations or by permit. The State of California has incorporated the protection of birds of prey in Sections 3800, 3513, and 3503.5 of the Fish and Game Code.

All raptors and their nests are protected from take or disturbance under the MBTA (16 United States Code [USC], Section 703 et seq.) and California statute (Fish and Game Code Section 3503.5). The golden eagle and bald eagle are also afforded additional protection under the Eagle Protection Act, amended in 1973 (16 USC, Section 669 et seq.).

Bald and Golden Eagle Protection Act

The bald eagle and golden eagle are federally protected under the Bald and Golden Eagle Protection Act (16 USC 668–668c). It is illegal to take, possess, sell, purchase, barter, offer to sell or purchase or barter, transport, export, or import at any time or in any manner a bald or golden eagle, alive or dead; or any part, nest or egg of these eagles unless authorized by the Secretary of the Interior. Violations are subject to fines and/or imprisonment for up to one year. Active nest sites are also protected from disturbance during the breeding season.

Executive Order 13112 – Invasive Species

Executive Order 13112 – Invasive Species directs all federal agencies to refrain from authorizing, funding, or carrying out actions or projects that may spread invasive species. The order further directs federal agencies to prevent the introduction of invasive species, control and monitor existing invasive species populations, restore native species to invaded ecosystems, research and develop prevention and control methods for invasive species, and promote public education on invasive species. As part of the proposed action, USFWS and USACE issue permits and are responsible for ensuring that the proposed action complies with Executive Order 13112 and does not contribute to the spread of invasive species.

4.4 BIOLOGICAL AND NATURAL RESOURCES

STATE

California Endangered Species Act

Under the California Endangered Species Act (CESA), the California Department of Fish and Game has the responsibility for maintaining a list of endangered and threatened species (Fish and Game Code 2070). CDFG maintains a list of "candidate species," which are species that CDFG formally notices as being under review for addition to the list of endangered or threatened species. CDFG also maintains lists of "species of special concern," which serve as species "watch lists." Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state listed endangered or threatened species may be present in the project site and determine whether the proposed project will have a potentially significant impact on such species. In addition, CDFG encourages informal consultation on any proposed project that may impact a candidate species.

Project-related impacts to species on the CESA endangered or threatened list would be considered significant. State listed species are fully protected under the mandates of the CESA. "Take" of protected species incidental to otherwise lawful management activities may be authorized under California Fish and Game Code Section 206.591. Authorization from the CDFG would be in the form of an Incidental Take Permit.

California Regional Water Quality Control Board

Clean Water Act, Section 401 Water Quality Certification

The Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) is responsible for enforcing water quality criteria and protecting water resources within the project site. CRRWQCB is responsible for controlling discharges to surface waters of the state by issuing waste discharge requirements (WDR) or commonly by issuing conditional waivers to WDRs. CRBRWQCB requires that a project proponent obtain a CWA Section 401 water quality certification or waiver for Section 404 permits granted by USACE. A request for water quality certification (including WDRs) by CRBRWQCB and a Notice of Intent (NOI) application for a General Permit for Storm Water Discharges Associated with Construction Activities are prepared and submitted following completion of the CEQA environmental document and submittal of the wetland delineation to the U.S. Army Corps of Engineers.

Delegated Permit Authority

California has been delegated permit authority for the National Pollutant Discharge Elimination System (NPDES) permit program including stormwater permits for all areas except Indian lands. Issuing CWA Section 404 dredge and fill permits remains the responsibility of USACE, but the State actively uses its CWA Section 401 certification authority to ensure 404 permits protect state water quality standards.

State Definition of Covered Waters

Under California state law, "waters of the state" means "any surface water or groundwater, including saline waters, within the boundaries of the state." Therefore, water quality laws apply to both surface and groundwater. After the U.S. Supreme Court decision in *Solid Waste Agency of Northern Cook County v. Army Corps of Engineers*, the Office of Chief Counsel of the State Water Resources Control Board (SWRCB) released a legal memorandum confirming the State's jurisdiction over isolated wetlands. The memorandum stated that under the California Porter-

Cologne Water Quality Control Act, discharges to wetlands and other waters of the state are subject to state regulation, and this includes isolated wetlands. In general, the regional water quality control boards regulate discharges to isolated waters in much the same way as they do for federal-jurisdictional waters, using Porter-Cologne rather than CWA authority.

California Department of Fish and Game

Streambed Alteration Agreement (Sections 1600–1607 of the California Fish and Game Code)

State and local public agencies are subject to Section 1602 of the California Fish and Game Code, which governs construction activities that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by CDFG. Under Section 1602, a discretionary Streambed Alteration Agreement permit must be issued by CDFG to the project developer prior to the initiation of construction activities within lands under CDFG jurisdiction. As a general rule, this requirement applies to any work undertaken within the 100-year floodplain of a stream or river containing fish or wildlife resources.

Native Plant Protection Act

The Native Plant Protection Act (California Fish and Game Code Sections 1900–1913) prohibits the taking, possessing, or sale within the state of any plants with a state designation of rare, threatened, or endangered (as defined by CDFG). An exception to this prohibition in the act allows landowners, under specified circumstances, to take listed plant species, provided that the owners first notify CDFG and give that state agency at least 10 days to come and retrieve (and presumably replant) the plants before they are plowed under or otherwise destroyed (Fish and Game Code Section 1913 exempts from “take” prohibition “the removal of endangered or rare native plants from a canal, lateral ditch, building site, or road, or other right of way”). Project impacts to these species are not considered significant unless the species are known to have a high potential to occur within the area of disturbance associated with construction of the proposed project.

Birds of Prey

Under Section 3503.5 of the California Fish and Game Code, it is unlawful to take, possess, or destroy any birds in the orders of Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.

“Fully Protected” Species

California statutes also accord “fully protected” status to a number of specifically identified birds, mammals, reptiles, and amphibians. These species cannot be taken, even with an incidental take permit. Section 3505 of the California Fish and Game Code makes it unlawful to take “any egret or egret, osprey, bird of paradise, gaura, numidi, or any part of such a bird.” Section 3511 protects from take the following fully protected birds: (a) American peregrine falcon (*Falco peregrinus anatum*); (b) brown pelican (*Pelecanus occidentalis*); (c) California black rail (*Laterallus jamaicensis coturniculus*); (d) California clapper rail (*Rallus longirostris obsoletus*); (e) California condor (*Gymnogyps californianus*); (f) California least tern (*Sterna albifrons browni*); (g) golden eagle; (h) greater sandhill crane (*Grus canadensis tabida*); (i) light-footed clapper rail (*Rallus longirostris levipes*); (j) southern bald eagle (*Haliaeetus leucocephalus leucocephalus*); (k) trumpeter swan (*Cygnus buccinator*); (l) white-tailed kite (*Elanus leucurus*); and (m) Yuma clapper rail (*Rallus longirostris yumanensis*).

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California Fish and Game Code Section 4700 identifies the following fully protected mammals that cannot be taken: (a) Morro Bay kangaroo rat (*Dipodomys heermanni morroensis*); (b) bighorn sheep (*Ovis canadensis*), except Nelson bighorn sheep (subspecies *Ovis canadensis nelsoni*); (d) Guadalupe fur seal (*Arctocephalus townsendi*); (e) ring-tailed cat (genus *Bassariscus*); (f) Pacific right whale (*Eubalaena sieboldi*); (g) salt-marsh harvest mouse (*Reithrodontomys raviventris*); (h) southern sea otter (*Enhydra lutris nereis*); and (i) wolverine (*Gulo gulo*).

Fish and Game Code Section 5050 protects from take the following fully protected reptiles and amphibians: (a) blunt-nosed leopard lizard (*Crotaphytus wislizenii silus*); (b) San Francisco garter snake (*Thamnophis sirtalis tetrataenia*); (c) Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*); (d) limestone salamander (*Hydromantes brunus*); and (e) black toad (*Bufo boreas exsul*).

Fish and Game Code Section 5515 also identifies certain fully protected fish that cannot lawfully be taken even with an incidental take permit. The following species are protected in this fashion: (a) Colorado River squawfish (*Ptychocheilus lucius*); (b) thicktail chub (*Gila crassicauda*); (c) Mohave chub (*Gila mohavensis*); (d) Lost River sucker (*Catostomus luxatus*); (e) Modoc sucker (*Catostomus microps*); (f) shortnose sucker (*Chasmistes brevirostris*); (g) humpback sucker (*Xyrauchen texanus*); (h) Owens River pupfish (*Cyprinodon radiosus*); (i) unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*); and (j) rough sculpin (*Cottus asperimus*).

NON-GOVERNMENTAL ORGANIZATIONS

California Native Plant Society

The California Native Plant Society (CNPS) maintains a list of plant species native to California that have low numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the Inventory of Rare and Endangered Vascular Plants of California. Potential impacts to populations of CNPS-listed plants receive consideration under CEQA review. The following identifies the definitions of the CNPS listings:

- List 1A: Plants Believed Extinct
- List 1B: Plants Rare, Threatened, or Endangered in California and elsewhere
- List 2: Plants Rare, Threatened, or Endangered in California, but more numerous elsewhere
- List 3: Plants about Which We Need More Information – A Review List
- List 4: Plants of Limited Distribution – A Watch List

LOCAL

County of Imperial General Plan

The County of Imperial General Plan Conservation and Open Space Element contains goals, objectives, policies, and programs applicable to biological resources. **Table 4.4-3** below identifies the County's General Plan policies and programs that are applicable to the proposed project and presents an evaluation of the consistency of the project with these statements as required by State CEQA Guidelines Section 15125(d). While this Draft EIR analyzes the project's

consistency with the General Plan pursuant to State CEQA Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

**TABLE 4.4-3
PROJECT CONSISTENCY WITH GENERAL PLAN BIOLOGICAL RESOURCE POLICIES**

General Plan Policies	Consistency with General Plan	Analysis
<p>Open Space Conservation Policy: The County shall participate in conducting detailed investigations into the significance, location, extent, and condition of natural resources in the County.</p> <p>Program: Notify any agency responsible for protecting plant and wildlife before approving a project which would impact a rare, sensitive, or unique plant or wildlife habitat.</p>	Yes	<p>Biological assessments and reports have been conducted at the project site in regard to the proposed project.</p> <p>Applicable agencies responsible for protecting plants and wildlife will be notified of the proposed project, as well as future development activities within the project area, and provided an opportunity to comment on this EIR prior to the County's consideration of any project approvals.</p>
<p>Open Space Conservation Policy: Provide a framework for the preservation and enhancement of natural and created open space which provides wildlife habitat values.</p>	Yes	<p>Mitigation measures listed in subsection 4.4.3 provide for preservation of identified special-status species and sensitive habitats within the project site.</p>
<p>Open Space Conservation Program: Identify Resource Areas (see Figure 3) to conserve and enhance native vegetation and wildlife. These areas shall include: BLM "Areas of Critical Environmental Concern (ACECs); areas of high value to wildlife; areas necessary for the protection and perpetuation of rare, endangered, and threatened species; and areas important for scientific study. Following identification of these areas, they shall be rezoned to limit development to low intensity uses which are compatible with resource conservation.</p>	Not applicable	<p>The proposed project site is not located within a Resource Area as identified in the General Plan.</p>
<p>Open Space Conservation Program: Projects within or in the vicinity of a Resource Area, as defined in the Imperial County General Plan EIR, should be designed to minimize adverse impacts on the biological resources it was created to protect.</p>	Not applicable	<p>The proposed project site is not located within a Resource Area as identified in the General Plan.</p>
<p>Open Space Conservation Program: Accept all donations of land which have high wildlife value. Where appropriate, Imperial County shall attempt to exchange donated lands of high wildlife value with other state, federal, or other resource agencies equipped to protect and manage such lands for other lands more appropriate to County needs.</p>	Not applicable	
<p>Open Space Conservation Program: Preserve the native habitat of sensitive plants and animals through the dedication of open space easements, and by other means that will ensure their long-term protection and survival. Such easements shall preclude the erecting of any structures (temporary or permanent), placement of utilities, vegetation removal, or any other activities. These dedicated open space easements would also serve to reduce</p>	Yes	<p>Native habitats are not found within the proposed project site. Mitigation measures in subsection 4.4.3 provide for preservation of identified special-status species and sensitive habitats within the project site.</p>

4.4 BIOLOGICAL AND NATURAL RESOURCES

General Plan Policies	Consistency with General Plan	Analysis
potential indirect impacts to sensitive biological resources that may result from human activities associated with future developments.		
Open Space Conservation Program: Areas designated for biological open space preservation shall include buffers, which provide important breeding and foraging habitats for native and migratory birds and animals. Such buffers shall serve to separate future development from adjacent native habitat areas to ensure the perpetual regeneration of these habitats.	Yes	The proposed project site does not contain areas designated for biological open space preservation. Native habitats are not found within the proposed project site. Mitigation measures listed in subsection 4.4.3 provide for preservation of identified special-status species and sensitive habitats within the project site.
Open Space Conservation Program: Protect riparian habitat and other types of wetlands from loss or modification by dedicating open space easements with adequate buffer zones, and by other means to avoid impacts from adjacent land uses. Road crossings or other disturbances of riparian habitat should be minimized and only allowed when alternatives have been considered and determined infeasible.	Yes	The proposed project site does not contain riparian habitat. Mitigation measures listed in subsection 4.4.3 provide for the protection of potential waters of the U.S., including wetlands, within the project site.
Open Space Conservation Program: Rock outcrops which serve as significant boulder habitat for sensitive biological resources shall be included within open space easements.	Not applicable	The proposed project site does not contain rock outcrops.
Open Space Conservation Program: Preserve existing California fan palms in natural settings and other individual specimen trees which contribute to the community character and provide wildlife habitat.	Not applicable	The proposed project site does not contain trees, including California fan palms.
Open Space Conservation Program: Preserve and encourage the open space designation of wildlife corridors which are essential to the long-term viability of wildlife populations.	Not applicable	The proposed project site does not contain wildlife corridors.
Open Space Conservation Program: Revegetation plans shall be submitted and approved by the Imperial County Planning Department and relevant resource agencies for the mitigation of sensitive habitat lost, and for disturbed areas created by roads or installation of facilities adjacent to native habitat. Such plans shall mitigate for the loss of sensitive habitat and habitat value based on a ratio consistent with accepted policy, as recommended by the State and federal resource agencies. (See specifications listed in General Plan document.)	Not applicable	The proposed project site does not contain native habitats.
Open Space Conservation Program: Clearing of shrubs, vines, and other native vegetation for purposes of fire control shall be coordinated with the local fire district, particularly in fire-prone areas. Where clearing is necessary, high-fuel plants shall be replaced with native, low-fuel plants. Where feasible or necessary for habitat protection, fire buffer	Not applicable	The proposed project site does not contain native habitats.

4.4 BIOLOGICAL AND NATURAL RESOURCES

General Plan Policies	Consistency with General Plan	Analysis
clearing shall be done by hand so as to minimize disturbance to understory species. A list of important understory groundcover, shrubs, vines, ferns, and other vegetation shall be compiled by a qualified biologist, and included in all required landscape plans prior to final approval of individual projects.		
<p>Land Use Element Policy: The General Plan covers the unincorporated area of the County and is not site specific, however, a majority of the privately owned land is located in the area identified by the General Plan as "Agriculture," which is also the predominate area where Burrowing Owls create habitats, typically in the brims and banks of agricultural fields.</p> <p>Program: Prior to approval of development of existing agricultural land either in form of one parcel or a numerous adjoining parcels equally a size of 10 acres or more shall prepare a Biological survey and mitigate the potential impacts. The survey must be prepared in accordance with the United States Fish and Wildlife and California Department of Fish and Game regulations, or as amended.</p>	Yes	See response to the Open Space Conservation Policy above. Additionally, burrowing owl surveys will be conducted in accordance with wildlife agency protocols prior to ground-disturbing activities. The results and mitigation are provided in this section.

4.4.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the State CEQA Guidelines Appendix G thresholds of significance. The project would have a significant impact if it would:

- 1) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or USFWS.
- 2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFG or USFWS.
- 3) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- 4) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- 5) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- 6) Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

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- 7) Reduce the number or restrict the range of an endangered, rare, or threatened plant or animal species or biotic community, thereby causing the species or community to drop below self-sustaining levels.

CEQA Guidelines Section 15380 further provides that a plant or animal species may be treated as “rare or endangered” even if not on one of the official lists if, for example, it is likely to become endangered in the foreseeable future.

METHODOLOGY

The impact assessment was based on the project description (Section 3.0), information described in the existing setting, and the standards of significance described above. The impact assessment discusses impacts to implementation of the proposed project within the project site.

In-office research: Prior to initiating site surveys, aerial photography was reviewed for potential habitat for the special-status species identified from the literature and database searches. A species was determined to have potential to occur in the project site if its documented geographic range from the literature and database search included the project vicinity and if suitable habitat for the species was identified within or near the project site. The CNDDDB was queried for a list of special-status plant and wildlife resources that are known to occur within the project site or vicinity (CDFG 2010). A database search was performed for special-status species within the Wiest, California, USGS 7.5-minute quadrangle (USGS 1957) and the surrounding quadrangles (Holtville NE, Alamorio, Westmorland, Niland, Brawley, Amos, Tortuga, and Iris). Locations of special-status species occurrences as recorded in CNDDDB within a 1-mile radius of the project site are shown in **Figure 4.4-1**.

The CNPS electronic online inventory was also searched for rare or endangered plants that may occur within the project site and in the surrounding vicinity (CNPS 2010). This query was performed for CNPS List 1A, List 1B, List 2, List 3, and List 4 special-status plants occurring in the USGS 7.5-minute quadrangles listed above. List 1A species are presumed extinct in California. List 1B species are considered rare or endangered in California and elsewhere. List 2 species are considered rare or endangered in California, but are more common elsewhere. List 3 species require further review and consideration. List 4 species are watch-list species; they are of limited distribution or infrequent throughout a broader area in California, and their vulnerability or susceptibility to threat appears relatively low at this time.

In addition, a formal USFWS species list for federally endangered, threatened, proposed, and candidate species that may occur in Imperial County was reviewed for species that could potentially be affected by the proposed project (USFWS 2010).

Tables 4.4-1 and **4.4-2** present the results of the CNDDDB, CNPS, and USFWS queries for special-status species that have the potential to occur within the project site and surrounding vicinities.

Field assessment: A biological survey of vegetation and animals and a focused western burrowing owl survey was completed by Marie Barrett, biologist, on January 25 and 31, February 6, May 29 and 30, 2008, and Marie Barrett, Glenna Barrett, and Shawna Bishop, biologists, on July 22 and 23, 2010.

Impact analysis: The analysis of impacts to biological resources presented in this section is based on previous biological investigations and reports, as well as on available literature and maps from federal, state, and local agencies, the project description (Section 3.0 of this Draft EIR), existing plans for the proposed project, and the standards of significance described above. The

assessment includes impacts within the project site. A conservative approach to biological resources was used to draft the biological resources analysis. A basic assumption of this conservative approach is that all natural resources within the project site could be removed or otherwise negatively modified by activities allowed under the proposed project design plan unless otherwise avoided.

Project components were considered to evaluate and assess potential impacts to biological resources. Construction of the proposed project has the potential to directly or indirectly affect biological resources as well as contribute to cumulative impacts. Potential impacts to biological resources can be temporary, long-term, or permanent depending on the effect of project activities on individual resources.

As discussed under Impact 4.8.5 in Section 4.8, Hydrology and Water Quality, an analysis was provided which looks at the proposed project's cumulative contribution to diversion of water from the Salton Sea. The Salton Sea provides habitat for numerous wildlife species including special-status fish and migratory birds. It was determined in this analysis that the cumulative diversion was negligible, with a less than significant impact related to reduction in the sea's average surface water elevation and salinity.

PROJECT IMPACTS AND MITIGATION MEASURES

Impacts to Endangered, Threatened, and Other Listed Species

Impact 4.4.1 Implementation of the proposed project could result in direct and indirect loss of habitat and individuals of endangered, threatened, rare, proposed, and candidate status, as well as plant species identified by the California Native Plant Society with a rating of List 1A or 1B (i.e., rare, threatened, or endangered plants). This would be a **potentially significant** impact.

New River Species

The New River originates in Mexico. It flows approximately 20 miles through the City of Mexicali, Mexico, crosses the International Boundary, continues through the City of Calexico in the United States, and travels northward about 60 miles until it empties into the Salton Sea. Its flow at the International Boundary is about 150 to 200 cubic feet per second (cfs) (108,400 to 145,000 acre-feet per year (AFY)). The New River carries urban runoff, untreated and partially treated municipal wastes, untreated and partially treated industrial wastes, and agricultural runoff from the Mexicali Valley, Mexico, across the International Boundary into the United States. In addition, the river carries urban runoff, agricultural runoff, treated industrial wastes, and treated, disinfected, and non-disinfected domestic wastes from the Imperial Valley. It also carries approximately 6 to 11 cfs (4,350 to 7,970 AFY) of treated wastewater from point sources in Imperial Valley. The New River flow at the Salton Sea is about 600 cfs (430,000 AFY) (SWRCB, 2010).

As discussed above, a portion of the flow that contributes to the New River originates in Mexico. The average annual flow measured by the U.S Geological Survey in the New River at the International Border between 1980 and 1997 was approximately 182,000 acre-feet. This contribution of inflow from Mexico accounts for approximately 30 to 35 percent of the flow in the New River. Additionally, flows from the New River to the Salton Sea vary from year to year. Flow record measurements for the mouth of the New River started in 1943 and range from 378,000 to 540,000 acre-feet per year (USBR, 2000). The contribution of flows from Mexico to the New River is difficult to gauge from year to year.

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Additionally, it is difficult to predict the amount of inflow changes within the U.S. New River area, and it typically fluctuates, because changes in cropping patterns will result in different amount of flow. For example, in the Imperial Valley, evapotranspiration from alfalfa is estimated to consume about 80.6 inches of water (6.7 feet) per year, while citrus crops consume only about 46.1 inches (3.84 feet) per year (USBR, 2000).

In order to determine a conservative estimate of the proposed project's contribution to reduced return flow to the New River, the average New River flow to the Salton Sea provided by the State Water Resources Control Board was used, or 430,000 acre-feet per year. The proposed project will require approximately 4,400 acre-feet of treated wastewater from the Brawley Wastewater Treatment Plant and an additional 1,110 acre-feet of water from the IID. The project will reduce the amount of return flow to the New River. The project's contribution to the reduction of return flow is approximately 0.01 percent. However, it is unlikely that the reduction of 4,400 acre-feet, or 0.01 percent, will have an impact on habitat in the New River. It is anticipated that the conditions of habitat in the New River will not be impacted because the reduction is well within the range of normal flow variations. This is because evapotranspiration occurs due to crop fluctuations.

Southwestern Willow Flycatcher

The southwestern willow flycatcher is a federally and state-listed endangered species. Take of the species including mortality, injury, or removal of occupied habitat is significant. Protocol-level surveys for southwestern willow flycatcher have not been conducted for the proposed project. This species may occupy suitable riparian habitat along the New River. It is recommended that prior to initiation of construction activities (including vegetation clearing), protocol-level surveys be conducted to ensure that this species is not actively using the project site.

Direct or indirect Impacts resulting from implementation of the proposed project are **potentially significant**.

Mitigation Measures

MM 4.4.1a A USFWS-approved biologist shall conduct protocol-level surveys for the southwestern willow flycatcher in all suitable habitat within the proposed project site according to the most current and available protocol (Survey Protocol for the Southwestern Willow Flycatcher by Mark K. Sogge, U.S. Geological Survey; Darrell Ahlers, Bureau of Reclamation; and Susan J. Sferra, U.S. Fish and Wildlife Service).

Timing/Implementation: Prior to the issuance of grading permits

Enforcement/Monitoring: County of Imperial Planning and Development Services Department; USFWS; CDFG

MM 4.4.1b If southwestern willow flycatchers are detected at anytime during surveys, construction activities associated with the proposed project will be restricted during the breeding season (May 15 through August 15) in the areas within a 0.5-mile radius of the New River.

Timing/Implementation: May 15 through August 15 if the species is detected

Enforcement/Monitoring: County of Imperial Planning and Development Services Department; USFWS; CDFG

Implementation of the above mitigation measures (**MM 4.4.1a** and **MM 4.4.1b**) would reduce potential impacts to endangered, threatened, rare, proposed, and candidate status species, as well as plant species, identified by the California Native Plant Society to a level that is considered **less than significant** by requiring protocol surveys.

Impacts to Species of Concern, California Fully Protected, and Other Non-Listed Special-Status Species

Impact 4.4.2 Implementation of the proposed East Brawley Geothermal Development project could result in direct and indirect loss of habitat and individuals of animal and plant species of concern, listed as “fully protected” in the California Fish and Game Code (Section 3511, 4700, 5050, 5515), migratory birds protected under the Migratory Bird Treaty Act, and other non-listed special-status species. This would be **potentially significant** impact.

Migratory Birds and Raptors (excluding the western burrowing owl)

The project site may support foraging activities for special-status bird species that may be present as identified in **Table 4.4-2**, including mountain plover and white-faced ibis. As identified in **Table 4.4-2**, special-status birds such as the yellow warbler, Crissal thrasher, and mountain plover may also nest in trees or other vegetation adjacent to the project site. Furthermore, migratory birds not identified in **Table 4.4-2**, such as northern harrier (*Circus cyaneus*), which are protected under the Migratory Bird Treaty Act (MBTA), may be impacted by project implementation should they be present. All native breeding birds (except game birds during hunting season), regardless of their listing status, are protected under the MBTA. There are no trees within the project site; however, a number of trees are located immediately adjacent to the project site. Noise and other human activity may result in nest abandonment if nesting special-status birds are present within 500 feet of a work site. These impacts would be considered **potentially significant**.

Other Special-Status Mammal Species (American Badger)

The American badger is a California species of special concern. Implementation of the proposed project could remove habitat for this species. If this species is present during construction activities, the proposed project may result in mortality or injury to individuals.

Mitigation Measures

MM 4.4.2a For trees that must be removed to construct each phase of the proposed project, the project proponent will target the removal of trees and other vegetation to occur outside the nesting season between September 1 and February 28. If trees cannot be removed outside the nesting season, pre-construction surveys will be conducted prior to vegetation removal to verify the absence of active nests within 500 feet of construction activities.

If construction or tree removal is proposed during the breeding/nesting season for local avian species (typically March 1 through August 31), a focused survey for active nests of raptors and migratory birds within and in the vicinity of (no less than 500 feet outside project boundaries, where possible)

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the project construction activities shall be conducted by a qualified biologist prior to each phase of development. Surveys shall include searches of all potential nest sites, including snags, shrubs, ground, buildings, and cliff faces. If no active nests are found, vegetation removal or construction activities may proceed.

If an active nest is located during pre-construction surveys, USFWS and/or CDFG (as appropriate) shall be notified regarding the status of the nest. Furthermore, construction activities shall be restricted as necessary to avoid disturbance of the nest until it is abandoned or the biologist deems disturbance potential to be minimal. Restrictions may include establishment of exclusion zones (no ingress of personnel or equipment at a minimum radius of 500 feet around an active bald eagle or osprey nest, 250 feet around an active other raptor nest, and 100 feet around an active migratory bird nest) or alteration of the construction schedule.

No action is necessary if no active nests are found or if construction will occur during the non-breeding season (generally September 1 through February 28).

Timing/Implementation: Fourteen (14) days prior to ground disturbance or tree removal for each phase of development

Enforcement/Monitoring: County of Imperial Planning and Development Services Department

MM 4.4.2b

A qualified biologist shall conduct a pre-construction den survey no more than two weeks prior to any grading or ground-breaking activity. The survey will identify dens for special-status mammals including Sierra Nevada red fox, California wolverine, and American badger. If active den/burrow sites for special-status mammals are identified, a mitigation plan shall be developed in consultation with the California Department of Fish and Game and/or U.S. Fish and Wildlife Service to ensure no animals are killed and that den/burrow sites are properly addressed. Measures may include, but are not limited to, enforcement of buffer zones restricting construction activities near den sites, and capture and relocation of the species. If active dens/burrows are present, they shall be monitored by a qualified biologist(s)/monitor(s) throughout construction to ensure no additional losses. If no active dens/burrows are found, then no further mitigation is necessary.

Timing/Implementation: Two weeks prior to construction and/or grading activities

Enforcement/Monitoring: County of Imperial Planning and Development Services Department

MM 4.4.2c

Worker Environmental Awareness Program. A worker environmental awareness program shall be established and implemented prior to construction to educate the construction crew on special-status species with the potential to occur in the area. The program shall include, at a minimum, species identification, a description of suitable habitat for this species, and measures to implement in the event that this species is found during

construction. The program shall be presented to all members of the construction crew.

Timing/Implementation: *Prior to any employee conducting work on the project site*

Enforcement/Monitoring: *County of Imperial Planning and Development Services Department*

MM 4.4.2d The following best management practices (BMPs) shall be implemented during construction to reduce impacts to special-status species and habitat:

- Limit construction equipment and associated activities to the project routes in areas that support sensitive resources.
- To eliminate an attraction to predators of special-status species, all food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in solid, closed containers (trash cans) and removed at the end of each working day from the entire construction site.
- Implement construction measures to avoid accidental transport and spread of invasive species including the cleaning of construction vehicles and equipment prior to entering the project site.
- To the maximum extent feasible, nighttime construction will be minimized.

Timing/Implementation: *During all project construction activities*

Enforcement/Monitoring: *County of Imperial Planning and Development Services Department*

Implementation of the above mitigation measures (**MM 4.4.2a** through **MM 4.4.2d**) would reduce potential impacts to species of concern, California fully protected, and other non-listed special-status species to a level that is considered **less than significant** by requiring pre-construction surveys and educating employees on the sensitive resources potentially occurring on the project site and measures to avoid sensitive resources, as well as by implementing best management practices during construction.

Impacts to Western Burrowing Owl

Impact 4.4.3 Implementation of the proposed project could result in the loss of populations or essential habitat for the western burrowing owl, a California species of concern. This would be considered a **potentially significant** impact.

The project site may support nesting and/or foraging habitat for the western burrowing owl, a special-status bird species that may be present as identified in **Table 4.4-2**. Ground-disturbing activities may adversely impact nesting burrowing owls, should they be present. Furthermore, noise and other human activity may result in nest abandonment if nesting owls are present within 250 feet of a work site. These impacts would be considered potentially significant.

According to the guidelines found in the CDFG 1995 Staff Report on Burrowing Owl Mitigation, mitigation is required if construction is to be initiated within 160 feet of an active burrow outside of the nesting season (September 1 through January 31) or within 250 feet during the nesting

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season (February 1 through August 31). The following mitigation measures apply the recommendations as described in the CDFG staff report (1995) and consideration of the site-specific dynamics associated with the burrowing owl population in the Imperial Valley.

Implementation of the proposed project could result in the loss of populations or essential habitat for the western burrowing owl, a California species of concern, which is a **potentially significant** impact.

Mitigation Measures

MM 4.4.3 Occupied western burrowing owl burrows shall not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by CDFG verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival.

If required, any mitigation actions shall be carried out prior to the nesting season, from September 1 to January 31. In addition, pre-construction surveys of suitable habitat on the project site and 150-foot buffer zones shall be conducted within 30 days prior to construction.

If avoidance is possible, then no disturbance of occupied burrows shall occur within 50 meters (approximately 160 feet) during the non-breeding season of September 1 through January 31 or within 75 meters (approximately 250 feet) during the breeding season of February 1 through August 31. Foraging habitat shall be permanently preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls or single unpaired resident bird, or as approved by CDFG.

When destruction of occupied burrows is unavoidable, in order to offset the loss of foraging and burrow habitat, foraging habitat per pair or unpaired resident bird shall be permanently protected in a location and configuration acceptable to CDFG. New burrows shall be created at a ratio of 2:1 in the protected habitat, or as approved by CDFG.

If owls must be moved away from the disturbance area, passive relocation techniques shall be used. Passive relocation shall incorporate the following guidance, subject to approval by CDFG: Owls should be excluded from burrows in the immediate impact zone and within a 50-meter (approximately 160 feet) buffer zone by installing one-way doors in burrow entrances. One-way doors should be left in place 48 hours to ensure owls have left the burrow before excavation.

Timing/Implementation: Prior to construction-related disturbance

Enforcement/Monitoring: County of Imperial Planning and Development Services Department and CDFG

Implementation of mitigation measures **MM 4.4.2c**, **MM 4.4.2d**, and **MM 4.4.3** would reduce potential effects to western burrowing owls to **less than significant**.

Impacts to Sensitive Biological Communities, Including Riparian Habitat

Impact 4.4.4 Implementation of the proposed project would result in disturbance, degradation, and/or removal of sensitive biological communities. This impact is considered **potentially significant**.

Implementation of the proposed East Brawley Geothermal Development project could result in disturbance, degradation, and removal of riparian habitat. Riparian habitat is under the jurisdiction of the CDFG under Section 1602 of the Fish and Game Code. CDFG regulates work that will substantially affect resources associated with rivers, streams, and lakes in California, pursuant to Fish and Game Code Sections 1600–1607. Any action from a project that substantially diverts or obstructs the natural flow or changes the bed, channel, or bank of any river or stream, or uses material from a streambed, must be previously authorized by CDFG in a Streambed Alteration Agreement under Section 1602 of the Fish and Game Code. This requirement may, in some cases, apply to any work undertaken within the 100-year floodplain of a body of water or its tributaries. As a general rule, however, it applies to any work done within the annual high water mark of a river or stream that contains or once contained fish and wildlife or that supports or once supported riparian vegetation. Implementation of the proposed project could result in direct and indirect impacts to riparian conditions along the New River.

Riparian habitat supports a high diversity of wildlife species and provides shade for streams and wetlands, maintaining stream temperatures and reducing river evaporation. Buffers are not only important to the species they support, but can reduce sediment and nutrient inputs into the river. The length of buffers is also important for stream functions.

Implementation of the proposed project would result in disturbance, degradation, and/or removal of sensitive biological communities, which is considered a **potentially significant**.

Mitigation Measures

MM 4.4.4a Where impacts to riparian habitat are not avoidable and on-site preservation is not possible, habitat compensation shall be required at a 1:1 impact preservation ratio. To mitigate for the permanent direct and indirect impacts from the proposed project, a mitigation and monitoring plan will be prepared for submittal to USACE with the Section 404 permit application. The mitigation plan will identify impacts on all jurisdictional features and mitigation measures that will be implemented to achieve the “no net loss” (i.e., the same amount of wetland resources lost to site development shall be replaced/created). This may include creation of wetland resources on the project site or off site as determined acceptable to USACE. To assist in the on-site revegetation, areas of vegetation with a diameter at breast height (DBH) of 4 inches or less that do not require complete removal shall be cut at ground level with hand-operated power.

Timing/Implementation: Prior to construction-related disturbance to riparian habitat

Enforcement/Monitoring: County of Imperial Planning and Development Services Department

MM 4.4.4b A 1602 Streambed Alteration Agreement for removal of or disturbance to riparian habitat and waters of the United States (i.e., stream, lake, or river)

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from CDFG would also be required for the proposed project. This agreement will include measures to minimize and restore riparian habitat to pre-project conditions. The 1602 Streambed Alteration Agreement would require the project applicant to prepare and implement a riparian vegetation mitigation and monitoring plan for disturbed riparian vegetation.

Timing/Implementation: Prior to the start of construction activities that disturb riparian habitat

Enforcement/Monitoring: County of Imperial Planning and Development Services Department

Implementation of the above mitigation measures would reduce impacts to riparian habitat to a **less than significant** level by preserving and/or enhancing the riparian habitat within the project site.

Impacts to Jurisdictional Wetlands and Waters of the U.S.

Impact 4.4.5 The proposed project would potentially result in a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, riverine, irrigation canals, and seasonal wetland) through direct removal, filling, hydrological interruption, or other means. This is a **potentially significant** impact.

The loss or fill of jurisdictional wetlands or waters of the U.S is potentially significant under CEQA regardless of habitat quality, as USACE has a no net loss policy. Implementation of the proposed project may impact jurisdictional wetlands or waters of the U.S as a result of the project. A formal delineation of wetland and waters of the U.S has not been conducted within the project area, and therefore impacts to these features cannot be ruled out. The project crosses the New River and runs both adjacent to and across several irrigation canals that are likely under the jurisdiction of USACE since the water with the canals ultimately drains to the Salton Sea. Authorization for such fill of jurisdictional features would be secured from USACE via the Section 404 permitting process prior to project implementation. Because a Section 404 permit would be required from USACE, a Section 401 permit would be also required from Colorado River Basin RWQCB. The project proponent would obtain authorization from both USACE and CRBRWQCB to fill/disturb these features prior to project implementation. The impacts will result from site grading and installation of infrastructure associated with the development of the proposed project.

The proposed project would potentially result in a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, riverine, irrigation canals, and seasonal wetland) through direct removal, filling, hydrological interruption, or other means, which is a **potentially significant** impact.

Mitigation Measures

MM 4.4.5 The project applicant shall comply with the USACE “no net loss” policy for mitigation of wetlands/waters under the jurisdiction of USACE. The applicant must apply for a Section 404 permit, a Section 401 permit, and a 1602 Streambed Alteration Agreement. If wetland resources are proposed to be taken, the project applicant shall do the following:

1. If required, apply for a Section 404 permit from USACE after verification of the wetland delineation by USACE. Any waters of the U.S. that would be lost or disturbed shall be replaced or rehabilitated on a no net loss basis in accordance with the USACE mitigation guidelines. On-site creation of wetland habitat is preferred to off-site mitigation. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods agreeable to the USACE.
2. Obtain a Section 401 water quality waiver of certification from the RWQCB.
3. A mitigation plan shall be implemented that includes one of the following:
 - a. Completion of an on-site mitigation and monitoring plan that includes on-site creation/preservation of the wetlands/waters. This will include measures to avoid impacts to wetlands and habitat to be preserved such as fencing, best management practices to protect water quality, and other appropriate measures.
 - b. Credits may be obtained at an approved mitigation bank.

The project applicant shall provide written evidence to the County of Imperial from USACE and CRBRWQCB that this measure has been complied with prior to project approval.

Timing/Implementation: Prior to the start of construction activities that would impact wetlands

Enforcement/Monitoring: County of Imperial Planning and Development Services Department

The U.S. Army Corps of Engineers, along with the Colorado River Basin RWQCB and possible input from USFWS, will require compensatory mitigation measures to effectively mitigate any potential loss of these resources. Implementation of the above mitigation measures and mitigation measures **MM 4.4.2d** and **MM 4.4.4a**, as well as construction and operational water quality control mitigation measures identified in Section 4.8, Hydrology and Water Quality, would reduce potential impacts to water quality and aquatic resources to a level that is considered **less than significant**.

Impacts to the Movement of Native Resident or Migratory Fish or Wildlife Species or within Established Migratory Corridor

Impact 4.4.6 Development of the project site would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. This is considered a **less than significant** impact.

Wildlife movement corridors are routes frequently utilized by wildlife that provide shelter and sufficient food supplies to support wildlife species during migration. Movement corridors generally consist of riparian, woodland, or forested habitats that span contiguous acres of undisturbed habitat. Wildlife movement corridors are an important element of resident species home ranges. The project site is not within an established migratory route for deer. Although the

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river is used by common wildlife, the project includes buffers around the river and corridors connecting wetlands. Introduction of roads and urban development have the potential to fragment habitat for wildlife that depend on extensive, undisturbed tracts of open space. Waterways such as the New River and irrigation canals offer movement corridors for wildlife species such as white-faced ibis and other common bird species, while the moist understory provides habitat and food for a series of wildlife. Although there is potential for impact, the proposed project is not likely to interfere substantially with the movement of wildlife species in terms of population. Therefore, this impact is considered **less than significant**.

Mitigation Measures

None required.

Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local, Regional, or State Habitat Conservation Plan

Impact 4.4.7 Implementation of the proposed project would not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or any adopted biological resources recovery or conservation plan of any federal or state agency. Thus, there would be **no impact**.

Currently there is no adopted habitat conservation plan, natural community conservation plan, nor any other conservation or recovery plan in effect for the project site, in whole or in part. There are **no impacts**.

Mitigation Measures

None required.

4.4.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting includes the areas containing biological resources within the Imperial County region. Development anticipated as part of the cumulative condition is illustrated in **Figure 4.0-1** and referenced in the pending and proposed projects listed in **Table 4.0-1** in Section 4.0, Assumptions.

Future proposed and planned development would change the intensity of land uses in the surrounding area, which may result in biological and natural resources impacts, including loss of natural habitats and associated species. The cumulative impact analysis herein focuses on the proposed project's contribution to cumulative impacts and whether that contribution is considered cumulatively considerable.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Special-Status and Sensitive Species

Impact 4.4.8 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in potential disturbance to special-status species and sensitive habitats

throughout the region. This impact is considered **potentially cumulatively considerable**.

The agricultural community within the proposed project study area represents only a small portion of the habitat available for special-status wildlife species, including migratory birds. Implementation of the proposed project may result in degradation of wildlife habitat through a variety of actions which, when combined with other habitat impacts occurring from development in surrounding areas, would result in cumulatively considerable impacts. However, potential impacts associated with the proposed project are minimal considering the developed/disturbed nature of the study area. While it is unlikely that any remaining natural habitats within the project vicinity would be impacted, future development within the surrounding vicinity would have an unknown and unquantifiable impact on special-status species, biologically sensitive habitats, and potentially jurisdictional wetlands and waters of the U.S. Furthermore, increased development and disturbance created by human activities (e.g., fires, increased nighttime lighting) would result in direct mortality, habitat loss, and deterioration of habitat suitability. As the proposed project may contribute incrementally to these effects, the impact is considered cumulatively considerable.

In addition, as discussed under Impact 4.8.5 in Section 4.8, Hydrology and Water Quality, the proposed project would contribute to a cumulative diversion of water from the Salton Sea, which provides habitat for numerous wildlife species including special-status fish and migratory birds. However, this cumulative diversion was determined to result in a negligible reduction in the sea's average surface water elevation and salinity. As such, there would be a less than cumulatively considerable impact on the special-status plant and wildlife species that inhabit the Salton Sea as well as the habitat provided by its waters and shoreline.

Mitigation Measures

No additional mitigation is required. Mitigation measures **MM 4.4.1** through **MM 4.4.5**, described above, provide mitigation requirements addressing biological resources. The mitigation measures assist in reducing significant impacts to cumulative biological resources. Therefore, cumulative impacts related to biological resources would be reduced to **less than cumulatively considerable**.

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4.4 BIOLOGICAL AND NATURAL RESOURCES

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4.5 CULTURAL RESOURCES

4.5.1 INTRODUCTION

The California Environmental Quality Act (CEQA), encoded in Section 21000 et seq. of the Public Resources Code (PRC) with guidelines for implementation codified in the California Code of Regulations (CCR), Title 14, Chapter 3, Sections 15000 et seq., requires state and local public agencies to identify the environmental impacts of proposed discretionary activities or projects, determine if the impacts will be significant, and identify alternatives and mitigation measures that will substantially reduce or eliminate significant impacts to the environment.

This section considers and evaluates the potential impacts of the proposed project on cultural resources. Cultural resources include prehistoric and historic archaeological sites, archaeological districts, historic buildings and structures, and isolated occurrences of artifacts. Paleontological resources include vertebrate, invertebrate, or plant fossils. This Draft Environmental Impact Report (Draft EIR or DEIR) utilizes technical information and analyses from a cultural resources study (Tierra Environmental Services 2008). Whereas the results are summarized herein, the technical report is not included in the DEIR, which is supported by the State CEQA Guidelines (see Sections 15148 [Citation] and 15150 [Incorporation by Reference]). The cultural resources study and subsequent addendums are included as **Appendix G** to this DEIR. The Imperial County General Plan was also reviewed as part of this DEIR. By utilizing these provisions of the State CEQA Guidelines, Imperial County, in preparing this DEIR, has been able to make maximum feasible and appropriate use of this technical information.

4.5.2 CULTURAL RESOURCES CONCEPTS AND TERMINOLOGY

The following definitions are common terms used to discuss the regulatory requirements and treatment of cultural resources:

Cultural resources, as described above, is the overarching term used to describe physical manifestations of past human behavior, including archaeological resources and historic built environment resources. The California Office of Historic Preservation (OHP) recommends that all resources greater than 45 years of age be identified and assessed within a project area. Cultural resources include resource areas identified by Native Americans as containing traditional and/or sacred values and do not necessarily exhibit physical manifestations.

A *historical resource* is a resource that is eligible for listing or is listed in the California Register of Historical Resources (California Register) and includes buildings, sites, structures, objects, or districts that are historically or archaeologically significant. A resource may be listed as a historical resource in the California Register if it meets any of the following National Register of Historic Places criteria:

- 1) It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- 2) It is associated with the lives of persons important in our past.
- 3) It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
- 4) It has yielded, or may be likely to yield, information important in prehistory or history.

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Historical resources are considered part of the environment and a project that may cause a substantial adverse effect on the significance of a historical resource is a project that may have a significant effect on the environment. The definition of historical resources is contained in Section 15064.5 of the CEQA Guidelines.

Paleontological resource is defined as including fossilized remains of vertebrate and invertebrate organisms, fossil tracks and trackways, and plant fossils. A unique paleontological site would include a known area of fossil-bearing rock strata.

4.5.3 EXISTING SETTING

Approximately 100 million years ago, during the late Cretaceous period, a granitic and gabbroic batholith was being formed under and east of the project area. The batholith was uplifted and formed a granitic rock outcrop of the San Jacinto Mountains. Around the same time the mountains were forming, the Salton Trough was dropping to points below sea level. The Salton Trough had been slowly filling with sediments from the adjacent mountains and the Colorado River. The delta of the Salton Trough occasionally shifted, which formed the freshwater Lake Cahuilla, stretching approximately 60 miles long. Lake Cahuilla, which probably lasted until the 1500s, had a profound effect on the Cahuilla and other groups that were in the surrounding region (Tierra 2008, p. 4). The lake supplied the southern Coachella Valley with water, freshwater mussels, waterfowl, and fish. The Cahuilla utilized these resources designing U-shaped fish traps along the shoreline, leaving large deposits of mussel shell, bird, and fish bones (Tierra 2008, p. 4). The Cahuilla oral history tells of both drying and filling of the lake and its influence in the region.

The project is located in the historic bottom of Lake Cahuilla. The project site is approximately 142 feet below mean sea level, with the topography sloping gently to the northwest. The project consists of Holocene age alluvium, and soils consist of fine-grained silts and sands.

PREHISTORY

Paleoindian Period

The earliest well documented prehistoric sites in the southern California are identified as belonging to the Paleoindian period, which has locally been termed the San Dieguito complex/tradition. The Paleoindian period is thought to have occurred between 9,000 years ago, or earlier, and 8,000 years ago in this region. Although varying from the well-defined fluted point complexes such as Clovis, the San Dieguito complex is still seen as a hunting-focused economy with limited use of seed-grinding technology. The economy is generally focused on highly ranked resources such as large mammals and relatively high mobility, which may be related to following large game. Archaeological evidence associated with this period has been found around inland dry lakes, on old terrace deposits of the California desert, and near the coast (Tierra 2008, p. 5).

Early Archaic Period

Native Americans during the Archaic period had a generalized economic focus on hunting and gathering. In many parts of North America, Native Americans chose to replace this economy with others based on horticulture and agriculture. Southern California economies remained largely based on wild resource use until European contact. Changes in hunting technology and other important elements of material culture created two distinct subdivisions within the Archaic period in southern California (Tierra 2008, p. 5).

The Early Archaic period is differentiated from the earlier Paleoindian period by a shift to a more generalized economy and an increased focus on use of grinding and seed-processing technology. At sites dated between approximately 5,000 and 1,500 years before present (BP), the increased use of groundstone artifacts and atlatl dart points, along with a mixed core-based tool assemblage, identify a range of adaptations to a more diversified set of plant and animal resources. Variations of the Pinto and Elko series projectile points, large bifaces, manos and portable metates, core tools, and heavy use of marine invertebrates in coastal areas are characteristic of this period, but many coastal sites show limited use of diagnostic atlatl points. Major changes in technology within this relatively long chronological unit appear limited. Several scientists have considered changes in projectile point styles and artifact frequencies within the Early Archaic period to be indicative of population movements or units of cultural change but these units are poorly defined locally due to poor site preservation (Tierra 2008, pp. 5–6).

LATE PREHISTORIC PERIOD

Around 2,000 BP, Takic-speaking people from the Great Basin region began migrating into southern California, representing what is called the Late Prehistoric period. The Late Prehistoric period in this portion of Imperial County is recognized archaeologically by smaller projectile points, the replacement of flexed inhumations with cremation, the introduction of ceramics, and an emphasis on inland plant food collection and processing, especially acorns and mesquite. Inland semi-sedentary villages were established along major water courses and around springs, and montane areas were seasonally occupied to exploit mesquite, acorns, and piñon nuts. Mortars for mesquite and acorn processing increased in frequency relative to seed grinding basins (Tierra 2008, p. 6).

The late prehistoric period has provided the most archaeological resources in the Imperial Valley. The majority of the sites studied were small processing sites, associated with the grinding of vegetal resources and dating to the Late Prehistoric period. Larger habitation sites were less common, but displayed a wider range of activities and longer periods of occupation. Typical artifacts at these sites include Desert Side-notched and Cottonwood Triangular projectile points and Lower Colorado Buff Ware and Tizon Brown Ware ceramics. Lithic artifacts are typically made from chert, volcanic, or quartz material (Tierra 2008, p. 6).

The Kamia or Desert Kumeyaay occupied the project area during this period. The Kamia are a subgroup of the Yuman family of the Hokan stock and are therefore closely related linguistically to the Mohave, Quechan, Maricopa, Paipai, Cocopa, and Kiliwa. Group size and the degree of social interaction varied over the course of an annual cycle. The basic unit of production was the family, which was capable of great self-sufficiency, but Kamia/Kumeyaay families, like other hunter-gatherers, moved in and out of extended family camps or villages opportunistically as problems or opportunities arose. Thus, whereas single families occasionally exploited low-density, dispersed resources on their own, camps or villages of several families formed at other times, particularly when key resources (such as water) were highly localized (Tierra 2008, p. 6).

Beyond the basic social unit of the family, the Kamia/Kumeyaay were organized by some form of descent system. From the available ethnographic data, it is not immediately obvious as to whether they were organized into lineages or clans. Their features of social organization appear to have shared some qualities of both systems, and it may be speculated that the society had begun evolving from a lineage system to a clan system prior to the time of Western contact. The Kamia/Kumeyaay traced their descent patrilineally (i.e., through one's father), were exogamous at the level of the descent group (i.e., one had to marry outside one's own lineage or clan), and practiced patrilocal residence (i.e., a married woman lived with her husband's father's relatives). Descent groups apparently "owned" land and certain other resources. Resource

4.5 CULTURAL RESOURCES

ownership did not extend to the oak groves in the mountains, which probably reflects the extreme importance placed upon this resource for the adaptation and survival of the entire society. The Kamia had no clan chiefs and recognized a tribal chief like the Quechan; however, this form of leadership may have been introduced after European contact (Tierra 2008, p. 7).

The Kamia relied upon the resources of Lake Cahuilla. The lake advanced and receded numerous times throughout history. When the lake receded, prehistoric people followed the shoreline, leaving remains of habitation as they went. The lake would have provided the opportunity for nearly year-round exploitation of floral and faunal resources. Research has shown a heavy representation of shellfish, fish, aquatic birds, and plant materials from sites excavated along the edge of the lake (Tierra 2008, p. 7).

It appears that the Kamia and Cahuilla, among possibly some of the Colorado River peoples, are responsible for the sites located along the lake's shorelines. Sites excavated on the shoreline tend to be shallow with low artifact quantities and diversity and are indicative of temporary occupation. It has been suggested that groups came down from the mountains or canyons to the west and seasonally collected and processed fish and other fauna onsite before moving on to other resource locations (Tierra 2008, p. 7).

Kamia culture and society remained stable during the period of missionization on the coast. It was not until the American period that Kamia were heavily displaced. The introduction of European diseases greatly reduced the native population of southern California and further disrupted the way of life of the native inhabitants (Tierra 2008, p. 7).

ETHNOHISTORIC PERIOD

The Ethnohistoric period refers to a brief period when Native American culture was initially being affected by Euroamerican culture and historical records on Native American activities were limited. When the Spanish colonists began to settle California, the Kamia were on the margins of the mission system. They retained more of their culture due to their distance from mission influence. Although clans moved from place to place within their general territory, some locations were occupied for longer periods and by more people than others. These settlements, which may be regarded as villages, were places to which the people returned from their foraging, where they spent winter months, sometimes in association with other clans. Some larger groups appear to have had sizable summer as well as winter villages. Within each village there was a dance floor, extensive milling stations, family living areas, and possibly a sweat house and granary. If it was a winter camp, a house would have been set directly on the ground and a fireplace built on the ground by the door (Tierra 2008, p. 7).

The first European contact with native peoples of the area may have occurred as early as 1540 AD, but was first recorded by Juan Batista de Anza in 1774. Although there was little contact in the area with native peoples, European contact introduced disease that dramatically reduced the Native American population and helped to break down cultural institutions. The transition to a largely Euroamerican lifestyle did not occur until relatively rapidly in the late nineteenth century (Tierra 2008, pp. 7–8).

HISTORIC PERIOD

The project area remained largely unaffected by the transition to American control until the turn of the 20th century. The Salton Sea was created in 1905 when the Colorado River breached an Imperial Valley diversion channel and began to fill the Salton Sink. It took two years before the course of the river was restored to the Gulf of California. Imperial County was established in 1907.

Brawley was first platted in 1902 by the Imperial Land Company. The town was later incorporated in 1908. The agricultural fields in the project area have been affected by the installation of 32,222 miles of tile drainage lines beneath the agricultural fields of the Imperial Valley. These fields were installed during the second half of the 20th century to reduce previously existing salinity in the soil and prevent accumulation of salt in the farmland. The tile drains run to the canals surrounding the agricultural fields. The canals are connected to the New River, Alamo River, and other channels that empty into the Salton Sea. From its beginning until the present, the economic life of Brawley has been centered around agriculture and cattle (Tierra 2008, p. 9).

KNOWN CULTURAL RESOURCES IN THE PROJECT AREA

The records search performed by Tierra indicated several previous studies and recorded archaeological sites in the project area. Nine archaeological studies have been conducted within a half-mile radius of the project site, including some that covered portions of the project area. However, less than 10 percent of the project area was covered by these previous studies. One archaeological site (CA-IMP-2409) was previously recorded within the greater project area but was outside of the area proposed for direct impacts. Site CA-IMP-2409 was originally identified as a pottery kiln, but the area has since been developed with a golf course and the site appears to have been destroyed. A few village sites have also been identified on historic maps near the City of Brawley, but none of these are within a half-mile radius of the project area (Tierra 2008, p. 9).

A sensitivity map for cultural resources was prepared in 1990 and included in the County of Imperial General Plan. It indicated that areas along the New River are very sensitive for cultural resources. However, the current project area is located in an area north of Brawley that follows the New River to Ramer Lake and is considered to have zero to rare sensitivity for cultural resources (Tierra 2008, p. 9).

Historic research performed by Tierra included an examination of a variety of resources. The current listings of the National Register of Historic Places were checked through the National Register of Historic Places website. The California Inventory of Historic Resources and the California Historical Landmarks were also checked for historic resources.

Tierra also contacted the Native American Heritage Commission (NAHC) and requested a sacred land check for the project area. Fourteen groups or individuals were identified by the NAHC and these contacts were sent letters on November 7, 2008. The letter requested any appropriate information or comments pertinent to the project area that the addressee might have. Responses were received from two individuals on November 13, 2008. Mr. Preston Arrowweed of the Quechan Indian Nation and Ms. Carmen Lucas of the Kwaaymii Laguna Band of Mission Indians contacted Tierra. Mr. Arrowweed expressed that the Kamia tribe has an oral tradition that there is power and a powerful snake spirit present under the ground in the area and that underground disturbances such as drilling may cause a disruption in these forces that could adversely affect the natural world above ground. He requested that a Native American monitor be present for ground-disturbing activities related to the project. Ms. Lucas stated that although the project area has been disturbed over many years, there were once a number of sites located along the New River. Given the proximity of the project to the New River, she requested that a Native American monitor be present during ground-disturbing activities near the river (Tierra 2008, p. 10).

A survey of the project area was conducted by Patrick McGinnis and Hillary Murphy of Tierra on November 4, 2008. An intensive survey using parallel transects with 10- to 15-meter intervals was

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conducted throughout the project area. The project area in general has been greatly disturbed through continuous use for agriculture over the past 50 to 100 years. Because the project area is composed completely of agricultural fields, there were no hindrances to walking the project area. Visibility in the project area varied greatly. The project area ranged from fallow land with non-native bermuda grass covering from 20 to 95 percent of the ground surface to recently ripped and planted agricultural fields with 100 percent visibility. The power plant site was 90 percent covered by bermuda grass (Tierra 2008, p. 12). A total area of approximately 189 acres was surveyed for the cultural resources report. The survey did not identify any previously unrecorded cultural resources.

4.5.4 REGULATORY FRAMEWORK

FEDERAL

National Historic Preservation Act of 1966

This act provides for the survey, recovery, and preservation of significant paleontological data when such data may be destroyed or lost due to a federal, federally licensed, or federally funded project.

Federal Land Management and Policy Act of 1976

Defines significant fossils as unique, rare, or particularly well preserved; an unusual assemblage of common fossils; being of high scientific interest; or providing important new data concerning evolutionary trends, development of biological communities, interaction between or among organisms, unusual or spectacular circumstances in the history of life, or anatomical structure.

STATE

California Environmental Quality Act

CEQA requires lead agencies to carefully consider the potential effects of a project on historical resources. State CEQA Guidelines Section 15064.5 defines a significant effect as one that may cause a substantial adverse change in the significance of an historical resource. A "substantial adverse change" means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings, such that the significance of an historical resource is materially impaired.

The California Register serves as the authoritative guide to resources that are considered significant under CEQA. However, simply because a resource is not currently listed in the California Register does not mean that it is not a historical resource. A historical resource includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript that is historically or archaeologically significant (PRC Section 5020.1). Section 15064.5 of the State CEQA Guidelines specifies criteria for evaluating the importance of cultural resources. Native American concerns and the concerns of other interested persons and corporate entities, including but not limited to museums, historical commissions, associations, and societies, shall be solicited as part of the process of cultural resources inventory. In addition, California law protects Native American burials, skeletal remains, and associated grave goods regardless of their antiquity and provides for the sensitive treatment and disposition of those remains (Health and Safety Code Section 7050.5; PRC Section 5097.94 et seq.).

Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided that the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be historically significant if the resource meets any of the following criteria for listing on the California Register (PRC Section 5024.1(c); 14 CCR 4852):

- 1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- 2) Is associated with the lives of persons important in our past.
- 3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
- 4) Has yielded, or may be likely to yield, information important in prehistory or history.

California Public Resources Code Section 21083.2 also addresses the identification and protection of unique archaeological resources. A "unique archaeological resource," as defined in this section, is an archaeological artifact, object, or site about which it can be demonstrated there is a high probability that it meets any of the following criteria:

- 1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- 2) Has a special and particular quality, such as being the oldest of its type or the best available example of its type.
- 3) Is associated with a scientifically recognized important prehistoric or historic person or event.

LOCAL

Imperial County General Plan

The Imperial County General Plan provides goals, objectives, and policies for the identification and protection of significant cultural resources. The Open Space Element of the General Plan includes goals, objectives, and policies for the protection of cultural resources and scientific sites that emphasize identification, documentation, and protection of cultural resources. **Table 4.4-1** identifies General Plan policies for cultural resources that are relevant to the proposed project and summarizes the project's consistency with those policies. While the DEIR analyzes the project's consistency with the General Plan pursuant to State CEQA guidelines Section 15125(d), the Imperial County Board of Supervisors determine the project's consistency with the General Plan.

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**TABLE 4.5-1
PROJECT CONSISTENCY WITH THE GENERAL PLAN SIGNIFICANT CULTURAL RESOURCES
GOALS, OBJECTIVES, AND POLICIES**

Imperial County General Plan Policies	Consistency with General Plan	Analysis
IV. Open Space Implementation Programs and Policies 2. Cultural Resources Conservation Policy Identify and document significant historic and prehistoric resources, and provide for the preservation of representative and worthy examples; and recognize the value of historic and prehistoric resources, and assess current and proposed land uses for impacts upon these resources.	Yes, with mitigation	Cultural resources investigations are being conducted for the proposed project site. The proposed project is in compliance with this policy through incorporation of mitigation measures. Open space easements are being considered regarding the conservation of high-value cultural resources.

4.5.5 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

Following Public Resources Code Sections 21083.2 and 21084.1, and Section 15064.5 and Appendix G of the State CEQA Guidelines, cultural resource impacts are considered to be significant if implementation of the project would result in any of the following:

- 1) Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5.
- 2) Cause a substantial adverse change in the significance of an archaeological resource as defined in CEQA Guidelines Section 15064.5.
- 3) Disturb any human remains, including those interred outside of formal cemeteries.
- 4) Cause a substantial adverse change in the significance of a unique archaeological resource or as defined in Public Resources Code Section 21083.2.

State CEQA Guidelines Section 15064.5 defines “substantial adverse change” as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource is materially impaired.

METHODOLOGY

Tierra Environmental Services performed archival and archaeological survey investigations for the East Brawley Geothermal Plant, pipelines, and well sites in Imperial County. The archival research consisted of a literature and records search conducted for the project in addition to an examination of historic maps and historic site inventories. Additionally, a field survey was conducted in November 2008. Based on a review of the records search, previous work, and a historic map check, the area was found to contain a low density of cultural resources. The proximity to important water resources and an ethnographic village suggest the potential for prehistoric Native American cultural resources. Both historical and prehistoric resources were the focus of the field survey.

PROJECT IMPACTS AND MITIGATION MEASURES

Impacts to Prehistoric Resources, Historic Resources, and Human Remains

Impact 4.5.1 Implementation of the proposed East Brawley Geothermal Development project could result in impacts to prehistoric resources within project boundaries. This is considered **potentially significant**.

No historical resources or unique archaeological resources were identified within the boundaries of the proposed project. Although unlikely, project-related ground-disturbing activities could uncover previously unknown prehistoric resources, historic resources, or human remains within project boundaries because of the area's historical occupation by Native American peoples. This is considered a **potentially significant** impact.

The site of the Brawley Wastewater Treatment Plant (BWWTP) has been previously disturbed and developed. Furthermore, the proposed improvements at the BWWTP would not require any ground-disturbing activities. As such, there would be no impact to prehistoric resources, historic resources, or human remains associated with these improvements, and no mitigation would be required for this portion of the project.

Mitigation Measures

MM 4.5.1a If a Native American tribal monitor is available, the project applicant shall retain a Native American tribal monitor or Native American representative to be present during all excavation or other earth-moving activities within the East Brawley Geothermal Development project area. The project applicant shall notify the Imperial County Planning and Development Services Department immediately if any prehistoric or historic resources are uncovered. All construction must stop in the vicinity of the find and an archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology shall be retained to evaluate the finds and recommend appropriate action. The archaeologist shall work in coordination with the Native American tribal monitor or representative.

Imperial County and the project applicant shall consider mitigation recommendations presented by a professional archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology for any unanticipated discoveries. Imperial County and the project applicant shall consult and agree upon implementation of a measure or measures that Imperial County and the project applicant deem feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. The project proponent shall be required to implement any mitigation necessary for the protection of cultural resources.

Timing/Implementation: As a condition of project approval, and implemented during ground-disturbing construction activities

Enforcement/Monitoring: Imperial County Planning and Development Services Department

4.5 CULTURAL RESOURCES

MM 4.5.1b During all excavation or other earth-moving activities within the East Brawley Geothermal Development project area, should human remains be discovered, all work must stop in the immediate vicinity of the find, the Imperial County Planning and Development Services Department shall be notified immediately, and the County Coroner must be notified according to Section 7050.5 of the California Health and Safety Code. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed.

Timing/Implementation: As a condition of project approval, and implemented during ground-disturbing construction activities

Enforcement/Monitoring: Imperial County Planning and Development Services Department

Mitigation measures **MM 4.5.1a** and **MM 4.5.1b** require proper notification and mitigation for historic and prehistoric resources discovered during future project development within the project area and reduce the potential effects to a minimum. This impact is considered **less than significant**.

Project Impacts to Paleontological Resources

Impact 4.5.2 Construction activities associated with implementation of the proposed project could result in impacts to undiscovered paleontological resources. This is considered a **potentially significant** impact.

The sedimentary rocks in the vicinity of project site are Holocene to Pleistocene lake deposits. A search of the San Diego Natural History Museum collections database identified evidence of 12 recorded paleontological resource localities within 1 mile of the project area. All 12 of these localities are within the Holocene (approximately 200–300 years old) Cahuilla lake beds. These localities produced fossils of freshwater invertebrates (e.g., foraminifers, ostracods, gastropods, and clams), freshwater vertebrates (e.g., fish and amphibians), and terrestrial vertebrates (e.g., rodents) (San Diego Natural History Museum 2010). Therefore, it is possible that project-related ground-disturbing activities could uncover previously unknown paleontological resources. This is considered a **potentially significant** impact.

As described in Impact 4.5.1 above, the proposed improvements to the BWWTP would not involve any ground-disturbing activities. Also, the site of the BWWTP has been previously developed. Therefore, there would be no impact to paleontological resources as a result of these improvements, and no mitigation would be required for this portion of the project.

Mitigation Measures

MM 4.5.2 If any paleontological resources (fossils) are discovered during ground-disturbing project activity within the project area, all work in the immediate vicinity must stop and the project applicant shall notify the Imperial County Planning and Development Services Department immediately. A qualified paleontologist shall be retained to evaluate the finds and recommend appropriate mitigation measures for the inadvertently discovered paleontological resources.

Imperial County and the project applicant shall consider the mitigation recommendations of the qualified paleontologist for any unanticipated discoveries. Imperial County and the project applicant shall consult and agree upon implementation of a measure or measures that Imperial County and the project applicant deem feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. The project proponent shall be required to implement any mitigation necessary for the protection of paleontological resources.

Timing/Implementation: As a condition of project approval, and implemented during ground-disturbing construction activities.

Enforcement/Monitoring: Imperial County Planning Department

Mitigation measure **MM 4.5.2** requires notification and mitigation for paleontological resources discovered during future project development within the project area and would reduce the potential effects to a minimum. This impact is considered **less than significant**.

4.5.6 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting associated with the East Brawley Geothermal Development project includes proposed, planned, reasonably foreseeable, and approved projects and development in Imperial County and the southern California deserts as described in Section 4.0 and 5.0 of this Draft EIR. Developments and planned land uses in the region could contribute to potential conflicts with cultural and paleontological resources. These resources include archaeological resources associated with Native American activities and historic resources associated with settlement, farming, and economic development.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Prehistoric Resources, Historic Resources, and Human Remains

Impact 4.5.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could result in impacts to prehistoric resources, historic resources, and human remains. This impact is considered **potentially cumulatively considerable**.

Cumulative development in the region could result in the loss and/or degradation of cultural resources. The potential disturbance of human remains could also increase. These cumulative effects of development on cultural resources would be significant. As discussed under Impact 4.5.1, current archaeological and historical investigations for the project did not identify any prehistoric or historic resources or human remains within project boundaries. Regardless, there is the potential for the proposed project to uncover previously undiscovered cultural resources because of the area's historic occupation by Native Americans. The project's potential to contribute to the loss of these resources is cumulatively considerable.

4.5 CULTURAL RESOURCES

Mitigation Measures

No additional mitigation is required. Mitigation measures **MM 4.5.1a** and **MM 4.5.1b**, described above, provide mitigation requirements addressing historic and prehistoric resource-related impacts. The mitigation measures assist in reducing significant impacts to known and unknown prehistoric and historic resources and human remains. Therefore, cumulative impacts related to prehistoric and historic cultural resources and human remains would be reduced to **less than cumulatively considerable**.

Cumulative Impact to Paleontological Resources

Impact 4.5.4 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could result in the potential disturbance of paleontological resources (i.e., fossils and fossil formations). This impact is considered **potentially cumulatively considerable**.

Cumulative development in the region could result in the loss and/or degradation of paleontological resources. These cumulative effects of development on paleontological resources could be significant. As discussed under Impact 4.5.2, there are no known paleontological resources on the project site. However, due to the previous discovery of paleontological resources in Imperial County, there is the potential for paleontological resources to be discovered during construction of a project site. The proposed project's potential to contribute to the loss of these resources is cumulatively considerable.

Mitigation Measures

No additional mitigation is required. Mitigation measure **MM 4.5.2**, described above, provides mitigation requirements addressing paleontological resource-related impacts. Implementation of Imperial County General Plan policies and compliance with mitigation measure **MM 4.5.2** would assist in reducing significant impacts to known and unknown paleontological resources. Therefore, cumulative impacts related to paleontological resources would be reduced to **less than cumulatively considerable**.

REFERENCES

San Diego Natural History Museum. 2010. Paleontological Records Search – Ormat East Brawley Project.

Tierra Environmental Services. 2008. *Cultural Resources Survey of 189 Acres Proposed For Geothermal Development Near Brawley, Imperial County, CA.*

4.6 GEOLOGY AND SOILS

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) describes the geology and soil conditions of the proposed East Brawley Geothermal Development project site and general vicinity. The section also analyzes issues such as exposure of people and property to potential geologic and seismic hazards such as earthquakes, expansion, landform alteration, erosion, and liquefaction that could occur with implementation of the project. This analysis is based on a review of statutory law, local planning documents, and specific technical studies such as the geotechnical investigation prepared by Black Eagle Consultants, August 2008 (**Appendix H**); a Phase I Environmental Site Assessment prepared by Environ International Corporation, October 2008 (**Appendix J1**); a Phase I Environmental Site Assessment for the Former Jimenez Property, Near Brawley, prepared by Environ International, October 2009 (**Appendix J2**); and the Seismic and Public Safety Element from the Imperial County General Plan. Water quality issues are addressed in Section 4.8, Hydrology and Water Quality.

4.6.1 EXISTING SETTING

GEOLOGY AND TOPOGRAPHY

Regional Setting

The East Brawley Geothermal Development project site is located in the Imperial Valley, a part of the Salton Trough in the Colorado Desert physiographic province of California. With surface elevations as low as 275 feet below sea level, the Salton Trough formed as a structural depression resulting from tectonic boundary adjustment between the Pacific and the North American plates. The Salton Trough is bounded on the east and northeast by the San Andreas Fault and on the west by the San Jacinto fault zone. This structural trough is filled with more than 15,000 feet of Miocene and younger, marine and non-marine sediments capped by approximately 100 feet of Pleistocene and later lacustrine deposits that have been deposited by intermittent filling of the fresh-water Lake Cahuilla. There are surficial deposits in the project area as Quaternary lake beds, sediments of ancient Lake Cahuilla, and playa lakes with tan and grey fossiliferous clay, silt, sand, and gravel (Black Eagle 2008, p. 7).

Project Area

According to the geotechnical investigation of the geothermal plant site, the project site is essentially flat and without existing structures. The regional ground surface slopes toward the northeast at 12 feet per mile, or a 0.2 percent gradient. A grid network of drain pipes may underlie the site; a 3-inch-diameter, thin-wall perforated polyvinyl chloride (PVC) drain pipe in a coarse sand envelope was encountered at 5.5 feet below surface during excavation of a test pit (Black Eagle 2008, p. 3).

SOILS

The geotechnical study describes the site underlain by laterally continuous moderately to thickly bedded fat to lean clays with occasional moderately bedded silty sand and silt layers to at least 60 feet depth. The geotechnical investigations found ½- to 1½-foot-thick silt layer encountered within medium plasticity clay at depths ranging from 5 to 6½ feet below surface. Silty sand was also recorded at depths ranging from 4½ to 7 feet. An approximately 8- to 9-foot-thick silt layer was encountered starting at approximately 15 to 17 feet below surface (Black Eagle 2008, p. 8). Groundwater depth coincided with the upper surface of the silty sand layer at 15 to 17 feet below surface (Black Eagle 2008, p. 8).

4.6 GEOLOGY AND SOILS

FAULTS AND SEISMICITY

Much of the western United States is a region of moderate to intense seismicity related to movement of crustal masses (plate tectonics). The most active regions, outside of Alaska, are in the vicinity of the San Andreas Fault system of California.

Magnitude and intensity measure different characteristics of earthquakes. Magnitude measures the energy released at the source of the earthquake. Magnitude is determined from measurements on seismographs. Intensity measures the strength of shaking produced by the earthquake at a certain location. Intensity is determined from effects on people, structures, and the natural environment (USGS 2010).

The following table gives intensities that are typically observed at locations near the epicenter of earthquakes of different magnitudes.

**TABLE 4.6-1
MODIFIED MERCALLI INTENSITY SCALE FOR EARTHQUAKES**

Richter Magnitude Scale	Modified Mercalli Scale	Effects of Intensity
0.1–0.9	I	Not felt except by a very few under especially favorable conditions.
1.0–2.9	II	Felt only by a few persons at rest, especially on upper floors of buildings.
3.0–3.9	III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
4.0–4.5	IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motorcars rocked noticeably.
4.6–4.9	V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
5.0–5.5	VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
5.6–6.4	VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
6.5–6.9	VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, and walls. Heavy furniture overturned.
7.0–7.4	IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
7.5–7.9	X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
8.0–8.4	XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
8.5+	XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Source: USGS 2010

The power plant site lies in an area with a high potential for strong earthquake shaking. The project area lies within the seismically active Salton Trough of Southern California, near the southern terminus of the San Andreas Fault system. Seventy earthquakes with a magnitude greater than 5.0 have been reported within 100 miles of the site since 1987. It is generally accepted that a maximum credible earthquake in this area would be in the range of magnitude 7 to 7.4 along the San Andreas Fault system some 25 miles northeast of the project site. Other significant seismicity includes a possible maximum credible earthquake of magnitude 6.4 on the Brawley Seismic Zone approximately 1½ miles west of the site (Black Eagle 2008, p. 8).

Published fault activity maps (CDMG 1998; CGS 2002) show six major fault systems within 30 miles of the project site, all of which have evidence of Holocene movement. A computerized review of fault locations indicates 24 major faults and fault zones within 100 miles of the site (Black Eagle 2008, p. 9).

The Alquist-Priolo mapping projects show the nearest active fault being the Brawley fault zone (Type B fault), approximately 1½ miles west of the site. The nearest Alquist-Priolo-defined Type A fault is the Imperial Fault, approximately 5 miles to the south (Black Eagle 2008, p. 9).

Local Seismic Activity

Based on the geologic map, the faults in the vicinity of the project are considered active. However, no fault structures are mapped on or adjacent to the building site, and none were identified by the geotechnical investigation. Additional fault hazard mitigation or investigation is not considered necessary. **Figure 4.6-1** shows a map of regional faults and seismicity in relation to the proposed project site.

Ground Motion and Liquefaction

Table 4.6-1 below shows the peak bedrock acceleration predicted by the United States Geological Survey (USGS) between 1996 and 2002. A major reduction in peak ground acceleration between the 1996 and 2002 data resulted from USGS reclassifying the Brawley Fault from being an active splay of the San Andreas Fault zone to a more diffuse, smaller-magnitude hazard referred to as the Brawley Seismic Zone. In 1996, the Brawley Fault was assumed to have the same seismic risk associated with the 750-mile-long San Andreas Fault; in 2002, it was modeled based on actual fault sizes, potential magnitudes, and local seismic activity. Based on adoption of the new data by USGS, the geotechnical study recommends the latter data be used for project design (Black Eagle 2008, p. 9).

**TABLE 4.6-1
PEAK BEDROCK AND SURFACE ACCELERATIONS FOR THE PROJECT SITE**

Source	Probability of Exceedance	Peak Bedrock Acceleration (g)	Peak Ground Surface Acceleration (g)
USGS 1996	2 percent in 50 years	1.57	Not determined
	10 percent in 50 years	1.08	Not determined
USGS 2002	2 percent in 50 years	0.69	.40
	10 percent in 50 years	0.46	.40

[^] Peak ground surface acceleration including attenuation due to deep stiff soil profile using DMOD – 2000.

4.6 GEOLOGY AND SOILS

The geotechnical study determined that the site soils are non-liquefiable. Cyclic softening or strength reduction will be minor and is considered to have negligible impact on design for the project.

The geotechnical investigation performed site-specific wave propagation. The outcome suggests that softening of stiff lake clays and silts of Lake Cahuilla results in attenuation of short-period ground motions above 0.10 g (acceleration). For bedrock accelerations of 0.50 to 0.9 g, the peak ground acceleration is more or less constant between 0.25 and 0.30 g. The positive effect is that the site will have reduced peak ground acceleration. The negative effect is that ground motions will be stronger at longer periods, and since displacement is accentuated at longer periods, the overall ground surface displacements experienced will be higher than for a bedrock or stiff soil site (Black Eagle 2008, p. 11).

Subsidence

The Imperial Valley is subject to localized high levels of ground subsidence due to active ground water withdrawal for geothermal purposes. Ground subsidence is typically caused by pumping of groundwater or extraction of petroleum, such that the effective unit weight of the soil mass is increased, which in turn increases the effective stress on underlying soils, resulting in consolidation/settlement of the underlying soils. Subsidence may also be caused by tectonic processes. Normally, both of these forms of subsidence affect a regional area. Therefore, the potential for localized differential settlement that would damage project site facilities is very low (Black Eagle 2008, p. 10).

Floodplains

The Federal Emergency Management Agency (FEMA) has identified the site as lying in unshaded Zone C, areas of minimal flooding (Black Eagle 2008, p. 10).

Other Geologic Hazards

A high potential for dust generation is present if grading is performed in dry weather. Expansive clay soils are present across the site (Black Eagle 2008, p. 11) (see **Figure 4.6-2**).

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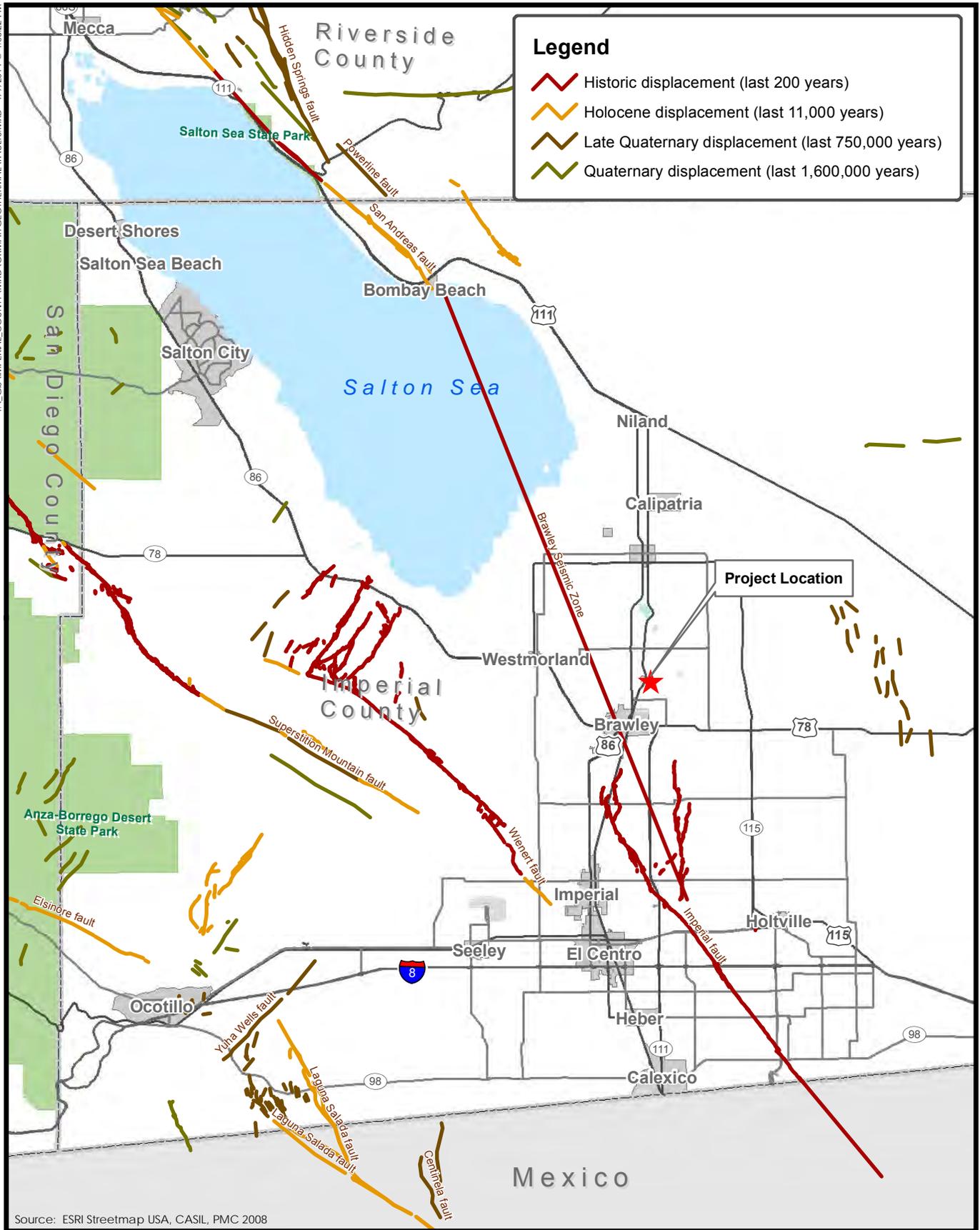


Figure 4.6-1
Faults Map



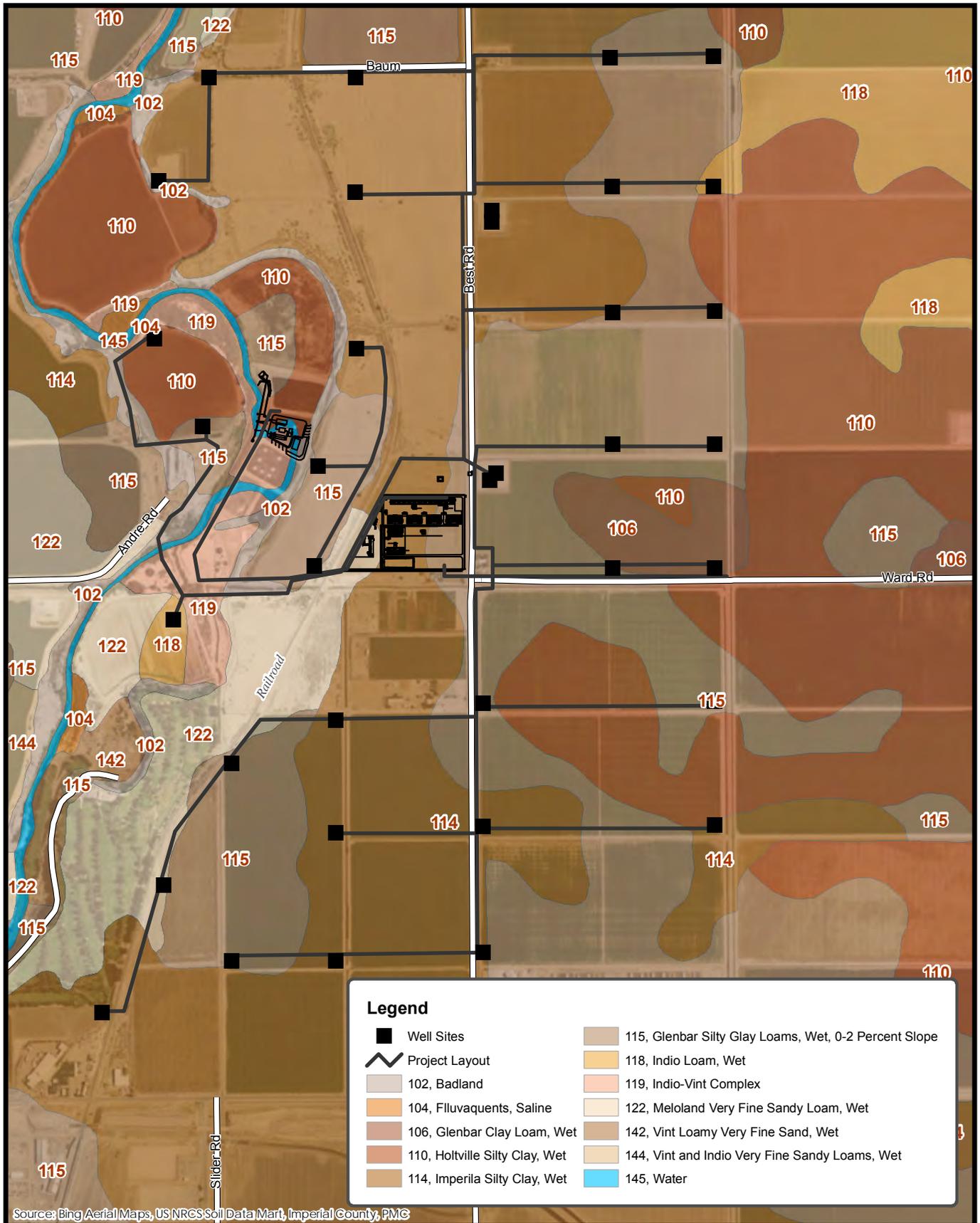


Figure 4.6-2
Soil Map

4.6.2 REGULATORY FRAMEWORK

STATE

Alquist-Priolo Earthquake Fault Zoning Act

The legislature of the State of California passed the Alquist-Priolo Geologic Hazards Zone Act in 1972, renamed the Alquist-Priolo Earthquake Fault Zoning Act in 1994. The intent of the legislation was to limit the hazards of fault surface rupture to occupied structures. Active faults are those with evidence of displacement within the past 11,000 years (Holocene time). Those faults with evidence of displacement during Pleistocene time (11,000 to 2,000,000 years before present) are generally considered potentially active. In 1974, the California Division of Mines and Geology (currently known as the California Geological Survey) began establishing special study zones along known active faults termed earthquake fault zones. Starting in 1976, the California Division of Mine and Geology initiated the Fault Evaluation and Zoning Program to study faults identified in the Alquist-Priolo Earthquake Fault Zoning Act as “sufficiently active and well defined” to be considered for further evaluation. Fault Evaluation Reports were prepared for each earthquake fault zone summarizing data on fault location, age of activity, orientation, and probable magnitude of displacement. The project site is not within any Alquist-Priolo Earthquake Fault Zone.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides. Passed by the State Legislature in 1990, this law was codified in the California Public Resources Code (PRC) as Division 2, Chapter 7.8A, and became operative in April 1991. The County of Imperial is not identified as having any Seismic Hazards Zones according to the United States Geological Survey (USGS).

California Building Code

The State of California provides minimum standards for building design through the California Building Code (CBC). The CBC is based on the Uniform Building Code (UBC), which is used widely throughout the United States (generally adopted on a state-by-state or district-by-district basis) and has been modified for conditions in California.

Regional Water Quality Control Board

The Regional Water Quality Control Board (RWQCB) issues permits for activities that could cause impacts to surface waters and groundwater in the vicinity of any project site, including construction activities. The National Pollution Discharge Elimination System (NPDES) stormwater permitting program, under Section 402(p) of the federal Clean Water Act, is administered by the RWQCB on behalf of the U.S. Environmental Protection Agency. The proposed project site falls under the jurisdiction of the Colorado River Basin RWQCB, Region 7. Permits issued to control pollution (i.e., waste discharge requirements and NPDES permits) must implement State Water Resources Control Board Basin Plan requirements (i.e., water quality standards), taking into consideration beneficial uses to be protected.

4.6 GEOLOGY AND SOILS

LOCAL

County of Imperial General Plan

Relevant Imperial County General Plan policies related to geology, soils, and seismicity are provided below. **Table 4.6-2** discusses the proposed project's consistency with the County's General Plan policies. While this Draft EIR analyzes the project's consistency with the General Plan pursuant to California Environmental Quality Act (CEQA) Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

**TABLE 4.6-2
PROJECT CONSISTENCY WITH GENERAL PLAN SEISMIC AND PUBLIC SAFETY POLICIES**

General Plan Policies	Consistency with General Plan	Analysis
<p>Policy – Seismic and Geologic Hazards <u>Program:</u> Implement codified ordinances and procedures which require the review and restriction of land use due to possible natural hazards. Ensure that no structure for human occupancy, other than one-story wood frame structures, shall be permitted within fifty feet of an active fault trace as designated on maps compiled by the State Geologist under the Alquist-Priolo Geologist Hazards Zone Act.</p>	<p align="center">Yes, with mitigation</p>	<p>A geotechnical report has been prepared by Black Eagle Consultants, Inc. for the proposed project, which includes safety considerations in land use planning. The geotechnical report has been referenced in this environmental document, and the report's recommended measures to mitigate potential geologic or seismic hazards that may be associated with the proposed project have been incorporated into this DEIR.</p> <p>Since the project site is located in a seismically active area, all proposed structures are required to be designed in accordance with the California Building Code (CBC) for near source factors derived from a design basis earthquake. In addition, appropriate mitigation measures have been incorporated into this DEIR to reduce risks associated with seismic hazards.</p> <p>The project site is not located within any Alquist-Priolo Earthquake Fault Zones as shown on the Index to Earthquake Fault Zone Map (Black Eagle 2008).</p>
<p>Objective 2.10 Reduce the risk of damage due to subsidence resulting from extraction of groundwater and geothermal resources by appropriate regulation.</p>	<p align="center">Yes, with mitigation</p>	<p>The project would participate in the Imperial County Subsidence Detection Program.</p>

4.6.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

Based on the criteria derived from Appendix G of the CEQA Guidelines, impacts related to geology and soils are considered to be significant if implementation of the project would result in any of the following:

- 1) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the

most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.

- 2) Strong seismic ground shaking.
- 3) Seismic-related ground failure, including liquefaction.
- 4) Landslides.
- 5) Result in substantial soil erosion or the loss of topsoil.
- 6) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.
- 7) Locating on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.
- 8) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

METHODOLOGY

Evaluation of potential geologic and soil impacts of the proposed project was based on the Geotechnical Investigation prepared by Black Eagle Consultants, August 2008; the Phase I Environmental Site Assessment prepared by Environ International Corporation, October 2008; another Phase I Environmental Site Assessment prepared by Environ International Corporation, October 2009; and the Seismic and Public Safety Element from the Imperial County General Plan. The project site will not be impacted by geologic hazards involving landslides and volcanic activity. The project site is relatively flat and not located immediately adjacent to steep areas susceptible to landslide. No volcanic activity is present in the region.

PROJECT IMPACTS AND MITIGATION MEASURES

Ground Rupture Impacts

Impact 4.6.1 The proposed project does not contain any known earthquake fault lines. Therefore, the impacts of ground rupture on the project site are considered **less than significant**.

Ground rupture is generally considered most likely to occur along pre-existing faults. The existence of active fault-related features and historic ground rupture has been documented in the County of Imperial. According to the geologic investigation prepared by Black Eagle Consultants, Inc. (2008), the project site does not lie within a State of California Alquist-Priolo Earthquake Fault Zone. Surface fault rupture at the project site is considered to be low to moderate. The Alquist-Priolo mapping projects show the nearest active fault being the Brawley fault zone, which is a Type B fault, approximately 1½ miles west of the site. The nearest Alquist-Priolo-defined Type A fault is the Imperial Fault, approximately 5 miles to the south.

The proposed project would be required to comply with the California Building Code (CBC) standards as adopted by the County of Imperial. Adherence to these standards would reduce

4.6 GEOLOGY AND SOILS

the potential for structural damage to facilities and corollary indirect impacts associated with seismic-related ground rupture to the extent feasible. Therefore, impacts associated with fault rupture on the project site are considered **less than significant**.

Mitigation Measures

None required.

Seismic Ground Shaking Impacts

Impact 4.6.2 The project site is located in a seismically active area. Seismic ground shaking impacts are considered **potentially significant**.

The project site has the potential to experience ground shaking during earthquakes along the Brawley and Imperial faults. The Brawley Fault is approximately 1.5 miles west of the project site. The nearest Alquist-Priolo-defined Type A fault is the Imperial Fault, located approximately 5 miles to the south of the project site (Black Eagle 2008, p. 9). Based on the proximity of mapped strands of these known faults, the potential for moderate to strong ground shaking at the site resulting from seismic activity in the region is likely.

The geotechnical study found that ground motions above 0.10 g, and for bedrock accelerations of 0.50 to 0.9 g (acceleration), the peak ground acceleration is more or less constant between 0.25 and 0.30 g. Wave propagation has both positive and negative effects. The positive effect is that the site will have reduced peak ground acceleration. The negative effect is that ground motions will be stronger at longer periods, and since displacement is accentuated at longer periods, the overall ground surface displacements experienced will be higher than for a bedrock or stiff soil site. Such seismic-related ground shaking has the potential to cause structural damage to facilities on the project site.

The proposed project's power plant facilities would be required to comply with the California Building Code as adopted by the County of Imperial. Adherence to CBC standards would reduce the potential for structural damage to facilities and corollary indirect impacts associated with seismic-related ground shaking to the extent feasible. However, as some risk related to seismic ground shaking would remain upon compliance with applicable regulatory standards, this impact would remain potentially significant without mitigation.

Mitigation Measures

MM 4.6.2 Prior to design and construction of the proposed project, site-specific geotechnical investigations shall be performed, including subsurface exploration and laboratory testing. If any potential seismic hazards exists for the potential for ground shaking through the geotechnical investigations, measures such as regrading, grout injection, or deep dynamic compression shall be incorporated into the site design and implemented during project construction to reduce potential hazards to a less than significant level, in accordance with CBC standards.

Timing/Implementation: Prior to approval of improvement plans

Enforcement/Monitoring: Imperial County Department of Public Works and Department of Planning and Development Services

The mitigation measures referenced above would further reduce the potential for structural damage to facilities and corollary indirect impacts associated with strong seismic ground shaking in accordance with CBC standards. Upon implementation of mitigation measure **MM 4.6.2**, project impacts related to seismic ground shaking would be **less than significant**.

Liquefaction Impacts

Impact 4.6.3 The risk of seismically induced liquefaction is low due to the depth of groundwater underlying the project site. However, some seismically induced settlement of the dry sands could occur. Impacts associated with liquefaction are considered **less than significant**.

A cone penerometer test was performed on the site by Black Eagle in August 2008. The cone penerometer testing involves pushing a cone through the underlying ground to determine site characterization, especially where discrete stratigraphic horizons or discontinuous lenses may exist. During the testing, the groundwater table was encountered at 10.6 feet below ground surface. Groundwater depth coincided with the upper surface of the silty sand layer at 15 to 17 feet below surface. Because of the low permeability of fine-grained soils, groundwater levels did not stabilize before the borings were backfilled in the current investigation (Black Eagle 2008, p. 8).

The geotechnical investigation determined that the site soils are non-liquefiable and that cyclic softening or strength reduction will be minor and is considered to have negligible impact on the design of the project (Black Eagle 2008, p. 10).

The Imperial Valley is subject to localized high levels of ground subsidence due to active ground water withdrawal for geothermal purposes. Ground subsidence is typically caused by pumping of groundwater or extraction of petroleum, such that the effective unit weight of the soil mass is increased, which in turn increases the effective stress on underlying soils, resulting in consolidation/settlement of the underlying soils. Subsidence may also be caused by tectonic processes. Normally, both of these forms of subsidence affect a regional area. Therefore, the potential for localized differential settlement that would damage project site facilities is very low (Black Eagle 2008, p. 10). This impact is considered to be **less than significant**. Nevertheless, the County will require the project proponent to participate in the County Subsidence and Monitoring and Detection Program as a condition of approval. The program requires project monitoring, which consists of establishing benchmarks within the geothermal site and connecting to the County's precise level network. All survey work shall be performed under the direct supervision of a person licensed to practice surveying in California. Work is required to conform to National Geodetic Survey and County of Imperial Department of Public Works standards. The project proponent is required to submit a plan for project subsidence monitoring to and shall implement the plan as approved by the Department of Public Works.

Mitigation Measures

None required.

Erosion Impacts

Impact 4.6.4 Development of the proposed project may require excavation and grading that could result in soil erosion and loss of topsoil during construction. This would be a **potentially significant** impact.

4.6 GEOLOGY AND SOILS

Dust potential at this site will be moderate to high during dry periods. Temporary (during construction) and permanent (after construction) erosion control will be required for all disturbed areas. The construction phase of the project would involve grading the site, excavation to prepare the site for building foundations, and trenching to install necessary infrastructure. Soil disturbance and stockpiling could be subject to erosion from both wind and water. Erosion potential can be managed by standard protocols in place at review of improvement plans. Because the site is larger than 5 acres in size, it would require compliance with National Pollution Discharge Elimination System (NPDES) criteria including preparation of a stormwater pollution prevention plan (SWPPP) and the inclusion of best management practices (BMPs) to control erosion and off-site transport of soils. The recently adopted State General Permit imposes more minimum BMPs and requirements that were previously only required as elements of the SWPPP or were suggested by guidance.

Additionally, erosion control would be accomplished in part through compliance with Imperial County Air Pollution Control District (ICAPCD) Rule 403 requirements (refer to Section 4.3, Air Quality). Compliance with these procedures will ensure that potential erosion is controlled during the construction process. Additional information on the project's NPDES permitting requirements, as well as SWPPP requirements, is available in Section 4.8, Hydrology and Water Quality. Therefore, implementation of the proposed mitigation measures would reduce the erosion impacts related to soil erosion and loss of topsoil to **less than significant**.

Proposed improvements at the BWWTP would not require any ground-disturbing activities and would not result in any soil erosion as the site has been previously developed.

Mitigation Measures

Implement mitigation measures **MM 4.3.2a** and **MM 4.8.1**. No additional mitigation is required.

Unstable Geologic Unit

Impact 4.6.5 The proposed project is not located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. This would be considered a **less than significant** impact.

Landsliding and lateral spreading usually occur in areas of relief, weak soil strength, and high groundwater. They are often triggered by earthquakes. The project site is in an area of low relief. The potential for localized land sliding or lateral spreading to occur within the project area is very low.

According to the geotechnical investigation, the risk of seismically induced liquefaction is low. Subsidence of about 0.2 feet should be anticipated from construction traffic on clay soils. Clay soils excavated and recompacted in nonstructural fills should experience quantity shrinkage of approximately 20 percent. In other words, one cubic yard of excavated clay will generate about 0.8 cubic yards of nonstructural fill at 85 percent relative compaction (Black Eagle 2008, p. 17). This impact is considered to be **less than significant**.

Mitigation Measures

None required.

Expansive Soil

Impact 4.6.6 The proposed project is located on expansive clay soils. Impacts associated with expansive soils are considered **potentially significant**.

The project site contains expansive clay soils. Newly constructed facilities could be damaged by differential settlement due to soil expansion and contraction as foundations have the tendency to rise during the wet season and shrink during the dry season. Movements can vary under the structures, which in turn create new stresses on various sections of the foundation. These variations in ground settlement can lead to structural failure and damage to infrastructure, even though the geotechnical investigation recommends using native clay soils as fill only in nonstructural areas. This impact would remain **potentially significant** without mitigation.

Mitigation Measures

MM 4.6.6 During project grading and filling activities, native clay soils should be placed as fill only in nonstructural areas. The project proponent shall adhere to the following recommendations as provided in the geotechnical investigation:

**TABLE 4.6-3
SPECIFICATION FOR IMPORTED STRUCTURAL FILL**

Sieve Size	Percent Weight Passing	
4 Inch	100	
¾ Inch	70-100	
No. 40	15-70	
No. 200	5-30	
Percent Passing No. 200 Sieve	Maximum Load Limit	Maximum Plastic Index
5-10	50	20
11-20	40	15
21-30	35	10
Fill should have a soluble sulfate content of less than 500 ppm (500 mg/kg).		

Timing/Implementation: Prior to approval of improvement plans

Enforcement/Monitoring: Imperial County Department of Public Works and Department of Planning and Development Services

Implementation of mitigation measure **MM 4.6.6** would reduce this impact to a level that is **less than significant**.

4.6 GEOLOGY AND SOILS

Septic Capability

Impact 4.6.7 The project proposes the use of septic systems for wastewater disposal. Impacts associated with soils capable of adequately supporting the use of septic tanks are considered **less than significant**.

The Center for Disease Control (CDC) has a rating system to assess the capability of soils to support septic tanks. The ratings for septic tanks are based on soil properties that affect absorption of the effluent, construction, and maintenance of the system and public health.

The proposed project would utilize a septic tank for the power plant project. In conjunction with siting of the septic tank, percolation testing of subsurface soil strata would be conducted and depth to groundwater would be measured to verify the estimated 10.6-foot depth calculated in the geotechnical report prepared for the proposed project (Black Eagle, 2008, p. 5). Should site geologic conditions for the groundwater depth not meet all local and state guidelines for cleansing/filtering of wastewater, then wastewater from septic tank discharges would be pretreated to allow subsurface discharge or applications to landscape areas (trees, shrubs, bushes, etc). Treatment of wastewater from septic tanks would be by a pump, mound system, or zero discharge system. All local and state laws would be adhered to. Therefore, the proposed project's impacts associated with soils capable of adequately supporting the use of septic tanks are considered **less than significant**.

4.6.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

Impacts associated with geology and soils generally are site-specific (determined by a particular site's soil characteristics, topography, and proposed land uses) rather than cumulative in nature. However, surficial deposits, namely erosion and sediment deposition, can be cumulative in nature, depending on the type and amount of development proposed in a given geographical area.

The cumulative setting for soil erosion consists of existing, planned, proposed, and reasonably foreseeable land use conditions in the region (see Section 4.0 for a description of the cumulative setting). However, construction constraints are primarily based on specific sites within a proposed development and on the soil characteristics and topography of each site. As discussed throughout this section, all new development must comply with the California Building Code, the applicant must submit a geotechnical report which contains construction and design guidelines and site-specific recommendations to reduce potential seismic, geologic, and soil-related hazards. The reader is referred to Section 4.8, Hydrology and Water Quality, regarding cumulative water quality impacts from soil erosion.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Geology and Soils Impact

Impact 4.6.8 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in continued urbanization of the area by increasing the density of development. This impact is considered **potentially cumulatively considerable**.

Cumulative development of planned and proposed projects in Imperial County is not anticipated to result in cumulative issues associated with geology and soils. Risks associated with seismic events and soil conditions, such as liquefaction, would be site-specific and are not anticipated to increase on a cumulative level.

Impacts regarding erosion and sediment deposition can be cumulative in nature if affecting a watershed. Impacts to water quality are addressed in Section 4.8, Hydrology and Water Quality. Buildout of approved and planned uses in the county have the potential to impact water quality. However, individual projects are required to comply with applicable codes, standards, and permitting requirements (e.g., preparation of a SWPPP) to mitigate erosion impacts. Development of the project site has the potential to contribute to soil erosion and loss of topsoil during construction. These potential impacts would be mitigated through the implementation of the SWPPP and BMPs. In addition, dust suppression measures in the ICAPCD CEQA Air Quality Handbook are included as part of mitigation measure **MM 4.3.2a** in Section 4.3, Air Quality, to reduce airborne pollutants. Impacts associated with erosion are mitigated on a project-by-project basis, which would reduce the overall cumulative impact to a less than significant level.

Due to the topography of the project vicinity, the proposed project is not susceptible to impacts associated with land sliding or lateral spreading. Therefore, there are no potentially cumulatively considerable impacts associated with the proposed project.

The project site is located in a seismically active area. The proposed project would not result in significant unavoidable impacts related to geology, soils, and seismicity, with the implementation of applicable mitigation measures. Furthermore, geology, soils, and seismicity impacts are site-specific and, at minimum, development of each individual project site is required to comply with County standards as well as applicable state codes and the CBC for Seismic Zone 4. Impacts resulting from ground shaking are reduced to a less than significant level through required compliance with the provisions of the California Building Standards, the CBC, and other applicable local and state building codes and seismic regulations. Also, site-specific geotechnical investigations performed by a qualified professional would further reduce the potential for structural damage to facilities. Mitigation measures outlined in this section, including densification of subsurface soils, selective grading, chemically treating soil, and implementing a SWPPP and BMPs, will all reduce the potential impacts discussed. Mitigation measures cited in **MM 4.6.6** will mitigate potential impacts from expansive soils. For these reasons, the proposed project is not anticipated to contribute to cumulative significant impacts related to geology and soils. Therefore, cumulative geological and soil-related impacts are considered less than cumulatively considerable.

Mitigation Measures

No additional mitigation is required. Implementation of mitigation measures **MM 4.6.2** and **MM 4.6.6** would ensure that potential impacts relating to geology and soils would be **less than cumulatively considerable**.

4.6 GEOLOGY AND SOILS

REFERENCES

- Black Eagle Consulting, Inc. 2008. *Geotechnical Investigation, East Brawley Geothermal Power Plant, Imperial County, CA.*
- California Division of Mines and Geology (CDMG). 1998. *Map of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada*: International Conference of Building Officials.
- California Geological Survey (CGS). 2002. Probabilistic Seismic Hazard Assessment (PSHA) Model 2002 (Revised April 2003). <http://www.conserv.ca.gov/cgs/rghm>.
- County of Imperial. 1993. *Imperial County General Plan, Seismic and Public Safety Element*. Imperial County, CA.
- Environ International Corporation. 2009. *Phase I Environmental Site Assessment, Former Jimenez Property, Near Brawley in California.*
- United States Geologic Services (USGS). 2010. Magnitude/Intensity Comparison. http://earthquake.usgs.gov/learn/topics/mag_vs_int.php (accessed November 16, 2010).

4.7 HAZARDOUS MATERIALS/PUBLIC HEALTH

This section addresses the potential presence of hazardous materials and conditions in the area of the proposed project and analyzes the risks associated with introducing the proposed development to the area. The information in this section is based on a Phase I Environmental Site Assessment prepared by Environ International Corporation, October 2008 (**Appendix J1**); a Phase I Environmental Site Assessment for the Former Jimenez Property, Near Brawley, prepared by Environ International, October 2009 (**Appendix J2**); and information provided in the CUP (Conditional Use Permit) application for the East Brawley geothermal facilities, the Off-Site Consequence Analysis, prepared by EMA, October 2008 (**Appendix J3**). The reader is referred to Section 4.6, Geology and Soils, for information regarding impacts associated with geologic and seismic hazards, Section 4.8, Hydrology and Water Quality, for information regarding impacts associated with flood hazards, and Section 4.3, Air Quality, regarding air quality hazards.

4.7.1 EXISTING SETTING

HAZARDOUS MATERIALS DEFINED

A material is considered hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local agency, or if it has characteristics defined as hazardous by such an agency. A hazardous material is defined in Title 22, Section 66260.10, of the California Code of Regulations (CCR) as:

A substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of or otherwise managed.

Chemical and physical properties cause a substance to be considered hazardous, including the properties of toxicity, ignitability, corrosivity, and reactivity, which are defined in the CCR, Title 22, Sections 66261.20–66261.24. Factors that influence the health effects of exposure to a hazardous material include the dose to which the person is exposed, the frequency of exposure, the exposure pathway, and individual susceptibility.

PROJECT SITE AND SURROUNDING USES

The geothermal plant site is owned by Ormat Nevada Inc., aka Orni 19, LLC, and consists of one parcel of 33.7 acres. There are 39 leased parcels encompassing approximately 3,033.2 acres that will contain proposed wells and pipelines. The site is bounded to the north by Rutherford Road, to the east by Deitrich Road, to the west by the New River, and to the south by an unnamed dirt access road (north of Shank Road). The site is predominantly agricultural land (both fallow and active), associated residences, a radio tower, a cattle feedlot, and a municipal golf course (Environ 2008, p. 10).

Table 4.7-1 provides a description of the project site's physical setting information.

4.7 HAZARDOUS MATERIALS/PUBLIC HEALTH

**TABLE 4.7-1
PHYSICAL SETTING**

Conditions	Source	Description
Topography		
Elevation (below mean sea level)	U.S. Geological Survey (USGS) topographic map Westmoreland East and Weist, California	Ranging from -150 to -125 feet.
Topographic Gradient	USGS topographic map, visual observations	The general topographic gradient is to the northwest.
Hydrology		
Surface Water Runoff	Visual observations	Surface water generally flows toward the northwest.
Nearest Surface Water Body	USGS topographic map	The nearest surface water body is the New River, which serves as the westernmost boundary.
Floodplain	Federal Emergency Management Agency (FEMA)	The project site is not located within the 500-year floodplain.
Wetlands	National Wetlands Inventory	Based on maps provided in the National Wetlands Inventory database maintained by the U.S. Fish and Wildlife Service (USFWS), the New River and immediately adjacent river banks are the only designated wetland areas at or within the vicinity of the project site.
Geology and Hydrogeology		
Presumed Direction of Shallow Groundwater Flow	Environmental Data Resources database report, topographic maps	Based on the local topography, the direction of the groundwater flow is toward the northwest, toward the Salton Sea.
Depth to Groundwater	Mr. John Benson (of John Benson Farms)	Average depth to groundwater is approximately 6 feet below ground surface.
On-Site Wells	DOGGR	There are four plugged and abandoned temperature gradient wells and one plugged and abandoned producing oil well on the project site. Two plugged and abandoned producing oil wells and five geothermal temperature gradient wells are near the project boundaries.
Nearest Groundwater Supply Wells	Mr. John Benson	Due to the salinity of the water, there are no groundwater wells in the majority of the Imperial Valley.
Geologic Conditions	Environmental Management Associates (2005)	Soils comprise silty-clay loams with very low infiltration rates.

Source: *Environ* 2008

The project site is actively cultivated for alfalfa. The cattle feedlot facility is located on the northwestern corner of the site, at the southeastern intersection of Kershaw Road and Rutherford Road. During site visits by the Phase I Environmental Site Assessment preparers, there appeared to be approximately 10 buildings and various silos and hoppers. Additionally, cattle corrals were located across Rutherford Road to the north. This portion of the site contained vehicles and miscellaneous equipment, and the site assessment noted significant quantities of chemical storage. There are four residences located within the project boundaries (including located near well pads and/or pipelines), as well as numerous ancillary structures associated with the residences. Both the residence located on the site of the proposed power plant and the residence located directly across Best Road from the power plant site are vacant and will be demolished as part of project construction. Some of the residences on the project site contain landscaped areas.

The Phase I Environmental Site Assessment preparers noted several unmanned wellheads. The well pads consist of temporary water retention basins, a small wellhead, and a gravel parking lot, and some contain aboveground storage tanks (ASTs) with approximately 1,000 gallons containment capability. The ASTs are not yet connected to the system or filled, but will contain anti-scalant and anti-bacterial additive to add to the water.

The Del Rio Country Club and Golf Course is located at the southwestern corner of the project site. The club contains a clubhouse and an 18-hole golf course. The golf course has a maintenance area that includes ASTs, vehicles, equipment, and drums and other containers. The site assessment did not investigate the maintenance yard; however, potential release of pesticide, herbicide, fungicide, descalants, adhesives, fuels, and/or other maintenance materials has the potential to occur on the site. There is also a radio tower located approximately 431 feet north of the golf course (Environ 2008, pp. 10–11) (refer to **Figure 3.0-5**).

Site History and Operations

Historical topographic maps from Environmental Data Resources (EDR) dating back to 1943 were reviewed for historical development of the site. The 1943 map does not show significant details, other than mapped roads, major rivers, water bodies, and railroads (Southern Pacific Calexico Railroad). The map shows some scattered structures that are most likely residential or agricultural in nature. In 1956, the site was mostly undeveloped with several scattered farmsteads and structures, with additional irrigation canals (Environ 2008, p. 21). In 1992, the Brawley Wastewater Treatment Plant and associated water tanks are visible to the west, and the golf course and a radio tower are visible at the southwest boundary.

Historical aerial photos from 1964 show the site as predominantly agricultural land. In the northwestern corner is a feedlot, and the southwestern corner contains the golf course and country club. The photo also shows what appears to be the beginning development of the Brawley Wastewater Treatment Plant, and north of the facility are rectangular structures (possible storage barns). In the 1981 photo, the Brawley Wastewater Treatment Plant is visible, as are several structures at the feedlot and industrial operations south of the golf course. There are three areas of cleared land: the southern side of Ward Road, the southern side of an unnamed road north of Ward Road, and the western side of Best Road. Areas appear that are consistent with the location of plugged and abandoned oil wells. The 2001 aerial photo shows an increase of industrial operations such as feed/grain processing and equipment maintenance and repair in the southern area of the golf course (Environ 2008, p. 23).

Contaminated Sites in the Vicinity of the Project Site

As part of the Phase I ESA, a computerized, environmental information database search was performed by Environmental Data Resources, Inc. on September 16, 2008, for the project site. The search was designed to assist parties seeking to meet the search requirements of the Environmental Protection Agency's (EPA) Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the American Standard of Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments (E 1527-05), and custom requirements developed for evaluation of environmental risk associated with a parcel of real estate. The search included federal, state, tribal, and local databases. The review was used to identify use, generation, storage, treatment, or disposal of hazardous materials and chemicals or release incidents of such materials (Environ 2008).

A description of the databases reviewed, search distances, and the number of facility listings within the respective search distance is provided in **Appendix J1**. Regulatory listings include only those facilities that are known to the regulatory agencies at the time of publication. According to the Phase I ESA, the project site is not on any hazardous material site lists; however, the following facilities located in the immediate vicinity of the project site were identified as being on such a list:

- **Superior Cattle Feeders, LLC**, 649 East Rutherford Road (on the northern boundary of the project site), is on the California Waste Discharge System (CA WDS) database maintained by the State Water Resources Control Board. The CA WDS tracks facilities that have been issued waste discharge requirements. Stafford Hannon Ranches is listed because it has a National Pollution Discharge Elimination System (NPDES) Permit for treating and/or discharging of wastewater associated with confined and concentrated animal feeding. Listing on the CA WDS database for permitted wastewater discharges is not indicative of significant environmental concern at the project site.
- **Bolsa Drainage, Inc.**, 5 Shank Road (near the southern boundary of the project site), is on the leaking underground storage tank (LUST) database for an unauthorized release of gasoline from an underground storage tank (UST). The release was discovered in September 1998. The impacted soils were excavated, treated, and disposed. The case received closure status in November 2002. Due to the nature of this release (it did not impact groundwater) and its regulatory status (closed), this former release is unlikely to pose a significant environmental threat to the project site.
- **Brawley Beef, LLC**, 57 Shank Road (south of the project site), is listed for accidental releases of used oil (April 7, 1989, and August 14, 2006), approximately 250 gallons of sodium hydroxide (May 19, 2006), and 200 gallons of industrial wastewater (June 15, 2007). All releases were reported to have affected soil only. Impacted soils were excavated and disposed at certified disposal and/or treatment facilities. All four incidents are listed as closed. Due to the nature of these releases (they did not impact groundwater), their regulatory status (closed), and distance relative to the project site, these releases are unlikely to pose a significant environmental threat to the project site.
- **Brawley Wastewater Treatment Plant**, 5015 Best Road (865 feet west of the power plant site), is on the LUST database for an unauthorized release of diesel fuel from a UST. The release was discovered in February 1990. The release was reported to have affected soil only; it was remediated and the facility received closure status from the Colorado River Basin Regional Board in June 1994. Due to the nature of this release (it did not impact

groundwater) and its regulatory status (closed), this former release is unlikely to pose a significant environmental threat to the project site (Environ 2008).

Site Reconnaissance

During the site reconnaissance performed by Environ as part of the Phase I ESA on September 17 and 18 and November 5, 2008, approximately 10 to 20 aboveground storage tanks (AST) were observed on the project site. In addition, drums and other containers suspected of containing petroleum products or other hazardous materials as well as propane cylinder tanks were observed on the site. There is also the potential for polychlorinated biphenyls in electrical or hydraulic equipment on the site as well as asbestos and lead-based paint in structures located on the site.

However, at the time of the site visit, removal of equipment and debris and cleaning of the property was ongoing. According to the property owner, much of the agricultural equipment and appliances and a boat had already been removed and the remaining items were organized for disposal or sale. Also according to the property owner, all oil-like liquids observed in the drums and other containers would be collected and disposed, and the propane cylinders are empty and unused (Environ 2008).

Airport Operations Hazards

The Brawley Municipal Airport is located approximately 1.3 miles south of the geothermal power plant project area. The site is 16.7 miles northeast of the El Centro Naval Air Facility, and the Imperial County Airport is located approximately 13.3 miles northeast of the project site. The project site is not located within the airport influence area for any public use airport (see **Figure 4.7-1**). On September 17, 2008, the Imperial County Airport Land Use Commission found the proposed project was consistent with the 1996 Airport Land Use Compatibility Plan.

**TABLE 4.7-2
AIRPORTS NEAR PROJECT SITE**

Airport Name	Distance from Project Site*	Direction from Project Site
Brawley Municipal Airport	1.3 mi.	South
O'Connell Brothers Airport	3.25 mi.	Southwest
Imperial County Airport	13.4 mi.	South-Southwest
Douthitt Strip	17.25 mi.	South
El Centro Naval Air Facility	15 mi.	Southwest
Holtville Airport	18.5 mi.	Southeast

Railroads

The southwest- to northeast-trending tracks of the Union Pacific Railroad border the west side of the proposed power plant site and bisect the western side of the pipeline and well portion of the proposed project. There are no stops or passenger rail service within the project area. Although the project proposes geothermal pipes and on-site track crossings for service vehicles, the project applicants are required as part of the approval process to obtain crossing permits and coordinate with the California Public Utilities Commission (CPUC).

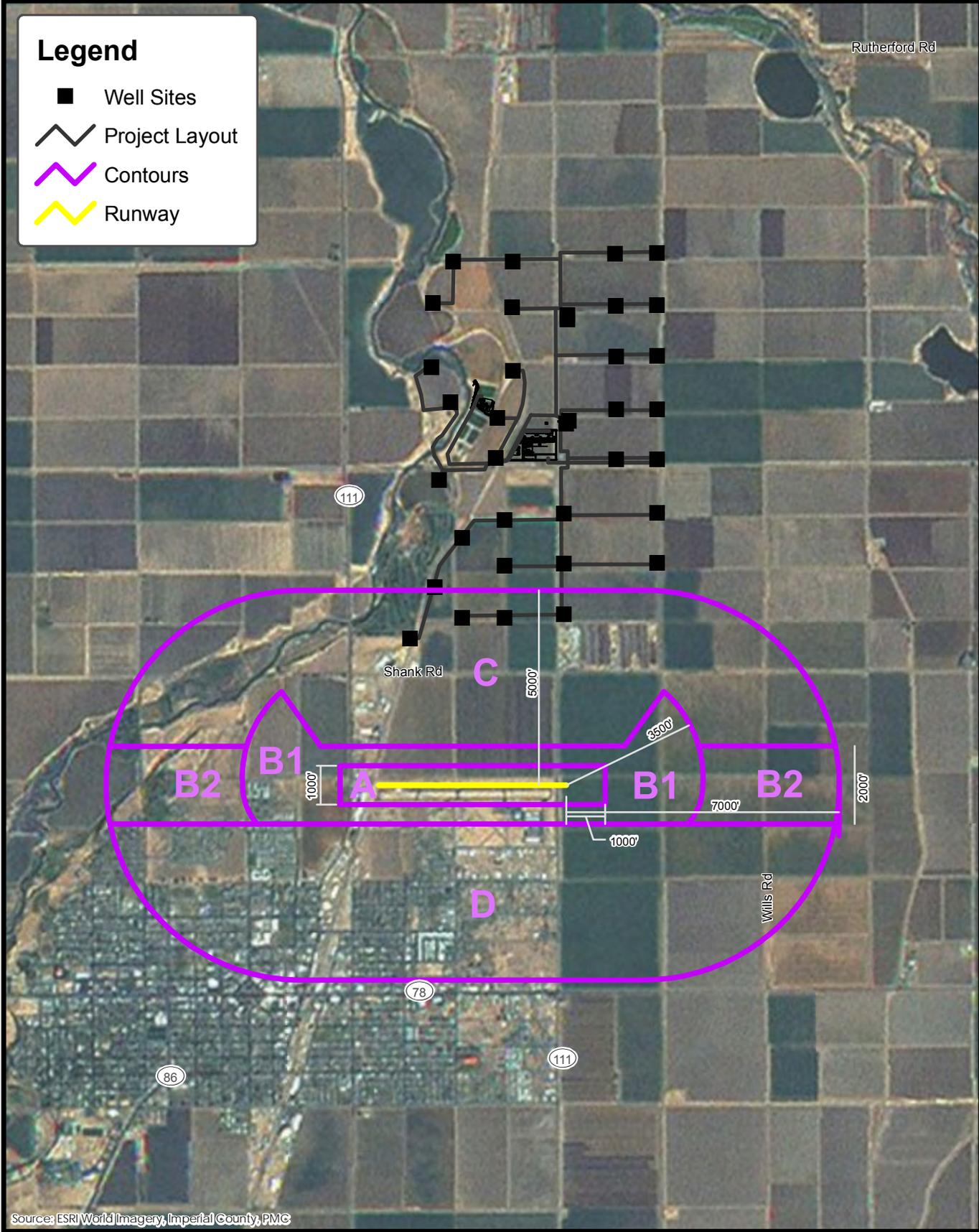
4.7 HAZARDOUS MATERIALS/PUBLIC HEALTH

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Legend

- Well Sites
- Project Layout
- Contours
- Runway



Source: ESRI World Imagery, Imperial County, PMC



Figure 4.7-1
Airport Zone Map



Roadways

Transportation of hazardous materials is heavily regulated by both federal and state agencies. The proposed project would be required to comply with regulations on transportation of hazardous materials codified in 49 CFR 173 and 49 CFR 177 and CCR Title 26, Division 6. Primary control of hazardous materials to and from the proposed project site lies with the California Highway Patrol (CHP), as much of the materials required for construction and operation of the proposed project would likely travel along State Route 78 and State Route 111.

4.7.2 REGULATORY FRAMEWORK

Federal, state, and local regulatory agencies that oversee hazardous materials handling and a summary of significant hazardous waste management, including the statutes and regulations these agencies administer, are listed in **Table 4.7-2** below.

**TABLE 4.7-2
SUMMARY OF HAZARDOUS MATERIALS REGULATORY AUTHORITY**

Regulatory Agency	Authority
Federal Agencies	
Department of Transportation (DOT)	Hazardous Materials Transport Act (49 U.S. Code [USC] 5101); Code of Federal Regulations (CFR) 49
Environmental Protection Agency (EPA)	Federal Water Pollution Control Act (33 USC 1251) Clean Air Act (42 USC 7401–7626) Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et seq.) Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 USC 9601 et seq.) Superfund Amendments and Reauthorization Act (SARA) (Public Law 99-499) Federal Insecticide, Fungicide and Rodenticide Act (40 CFR Parts 150–189) Toxic Substances Control Act (15 USC 2605)
Occupational Safety and Health Administration (OSHA)	Occupational Safety and Health Act and CFR 29
State Agencies	
California Environmental Protection Agency (Cal-EPA)	Unified Program (California Code of Regulations [CCR], Title 27)
Department of Conservation, Division of Oil, Gas and Geothermal Resources	CCR Title 14, Division 2, Chapter 2 (Implementation of the California Environmental Quality Act of 1970) and Chapter 4 (Development, Regulation, and Conservation of Oil and Gas Resources—with Subchapter 4: State-wide Geothermal Regulations)
Department of Toxic Substances Control (DTSC)	CCR, Title 22: Sections 66001–69214
Department of Industrial Relations (CAL-OSHA)	California Occupational Safety and Health Act (CCR Title 8, Div. 1, Ch. 3.2)

4.7 HAZARDOUS MATERIALS/PUBLIC HEALTH

Regulatory Agency	Authority
State Water Resources Control Board (and Regional Water Quality Control Board)	CCR Title 23, Div. 3, Sections 640-4007
	Porter-Cologne Water Quality Control Act, California Water Code, Div. 7
	Underground Storage Tank Program, CCR, Title 23, Ch. 16; Health & Safety Code, Chapters 6.7, 6.75; Assembly Bill 1702 Summary; AB 2481 Fact Sheet; AB 2481 and AB 1702 Summary Tables; Text of AB 2481
Health and Human Services Agency	CCR, Title 17
	Safe Drinking Water and Toxic Enforcement Act 1986, CCR, Title 27, Section 25601
	CCR, Title 22, Section 60301 et seq.
Air Resources Board and Air Pollution Control District	CCR Title 13, Sections 1900–2789, Title 17, Sections 60000–95007, Title 26
Office of Emergency Services	Hazardous Materials Release Response Plans/Inventory Law; California Health and Safety Code (HSC), Sections 25500–25520 and Government Code Section 8589.7. Section 2 contains excerpts from Title 19, California Code of Regulations, Sections 2720–2728.
Department of Food and Agriculture	Food and Agriculture Code
State Fire Marshall	Uniform Fire Code, CCR Title 19

FEDERAL

Environmental Protection Agency

The EPA provides leadership in the nation's environmental science, research, education, and assessment efforts. The EPA works closely with other federal agencies, state and local governments, and Indian tribes to develop and enforce regulations under existing environmental laws. The EPA is responsible for researching and setting national standards for a variety of environmental programs and delegates to states and tribes responsibility for issuing permits and for monitoring and enforcing compliance.

The EPA is the primary federal agency responsible for enforcement and implementation of federal laws and regulations pertaining to hazardous materials. Applicable federal regulations pertaining to hazardous materials are contained primarily in CFR Titles 29, 40, and 49, and in the following laws: Resources Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act, and Superfund Amendments and Reauthorization Act. These laws and associated regulations include specific requirements for facilities that generate, use, store, treat, and/or dispose of hazardous materials.

Under the authority of section 112(r) of the Clean Air Act, the Chemical Accident Prevention Provisions require facilities that produce, handle, process, distribute, or store certain chemicals to develop a risk management program, prepare a risk management plan (RMP), and submit the RMP to EPA. Covered facilities were initially required to comply with the rule in 1999, and the rule has been amended on several occasions since then, most recently in 2004.

Department of Transportation

The U.S. Department of Transportation (DOT), in conjunction with the EPA, is responsible for enforcement and implementation of federal laws and regulations pertaining to transportation of hazardous materials. The Hazardous Materials Transportation Act of 1974 directs the DOT to establish criteria and regulations regarding the safe storage and transportation of hazardous materials. Code of Federal Regulations (CFR) 49, 171–180, regulates the transportation of hazardous materials, types of material defined as hazardous, and the marking of vehicles transporting hazardous materials.

Other Federal Agencies

Other federal agencies that regulate hazardous materials include the Occupational Safety and Health Administration (OSHA), the National Institute of Health (NIH), and the U.S. Army Corps of Engineers. The following federal laws and guidelines govern hazardous materials.

- Federal Water Pollution Control
- Clean Air Act
- Occupational Safety and Health Act
- Federal Insecticide, Fungicide, and Rodenticide Act
- Comprehensive Environmental Response, Compensation, and Liability Act
- Guidelines for Carcinogens and Biohazards
- Superfund Amendments and Reauthorization Act Title III
- Resource Conservation and Recovery Act
- Safe Drinking Water Act
- Toxic Substances Control Act
- Clean Water Act

Prior to August 1992, the principal agency (at the federal level) regulating the generation, transport, and disposal of hazardous waste was the EPA under the authority of the Resource Conservation and Recovery Act (RCRA). As of August 1, 1992, however, the California Department of Toxic Substance Control (DTSC) was authorized to implement the State's hazardous waste management program for the EPA. The federal EPA continues to regulate hazardous substances under the Comprehensive Response Compensation and Liability Act.

STATE

California Environmental Protection Agency/Department of Toxic Substances Control

The California Environmental Protection Agency (CalEPA) and the State Water Resources Control Board establish rules governing the use of hazardous materials and the management of hazardous waste. Applicable state and local laws include the following:

- Public Safety/Fire Regulations/Building Codes

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- Hazardous Waste Control Law
- Hazardous Substances Information and Training Act
- Air Toxics Hot Spots and Emissions Inventory Law
- Underground Storage of Hazardous Substances Act
- Porter-Cologne Water Quality Control Act

Within CalEPA, the DTSC has primary regulatory responsibility, with delegation of enforcement to local jurisdictions that enter into agreements with the state agency, for the management of hazardous materials and the generation, transport, and disposal of hazardous waste under the authority of the Hazardous Waste Control Law.

California's Secretary for Environmental Protection has established a unified hazardous waste and hazardous materials management regulatory program (Unified Program) as required by statute (Health and Safety Code, Section 25001 et seq. and implemented by regulations described in Title 26 of the CCR). The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities for portions of the following six existing programs:

- Hazardous Waste Generators and Hazardous Waste On-site Treatment
- Underground Storage Tanks
- Hazardous Material Release Response Plans and Inventories
- California Accidental Release Prevention Program
- Aboveground Storage Tanks (spill control and countermeasure plan only)
- Uniform Fire Code Hazardous Material Management Plans and Inventories

The statute requires all counties to apply to the CalEPA Secretary for the certification of a local unified program agency. Qualified cities are also permitted to apply for certification. The local Certified Unified Program Agency (CUPA) is required to consolidate, coordinate, and make consistent the administrative requirements, permits, fee structures, and inspection and enforcement activities for these six program elements within the county. Most CUPAs have been established as a function of a local environmental health or fire department.

The Office of the State Fire Marshal participates in all levels of the CUPA program including regulatory oversight, CUPA certifications, evaluations of the approved CUPAs, and training and education. DTSC serves as the CUPA in Imperial County.

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources

California geothermal wells (except for wells on federal leases) are permitted, drilled, operated, and abandoned under requirements and procedures administered by the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources.

California Office of Emergency Services

The California Office of Emergency Services has developed an Emergency Response Plan to coordinate emergency services provided by federal, state, and local government and private agencies. Response to hazardous materials incidents is one part of this plan. The plan is managed by the State Office of Emergency Services (OES), which coordinates the responses of other agencies including CalEPA, the California Highway Patrol (CHP), California Department of Fish and Game (CDFG), Regional Water Quality Control Board (RWQCB), Imperial County Sheriff's Office, Imperial County Fire Department, and City of Imperial Police Department.

California Department of Transportation and California Highway Patrol

The California Department of Transportation (Caltrans) and the California Highway Patrol enforce and monitor U.S. DOT hazardous materials and waste transportation laws and regulations in California. These agencies determine the container types used and issue licenses to hazardous waste haulers for the transportation of hazardous wastes on public roads.

California Department of Industrial Relations, Division of Occupational Safety and Health Administration

The Division of Occupational Safety and Health Administration (Cal/OSHA) assumes the primary responsibility for developing and enforcing workplace safety regulations. Standards for workers dealing with hazardous materials include practices for all industries (General Industry Safety Orders) including control of hazardous substances and flammable liquids, gases, and vapors. Specific practices are described for construction and hazardous waste operations and emergency response. Cal/OSHA conducts on-site evaluations and issues notices of violations to enforce improvements to health and safety practices.

REGIONAL

Imperial County Office of Emergency Services – Emergency Operations Plan

The Imperial County Fire Department (ICFD) serves as the local Office of Emergency Services (OES) in Imperial County. The OES Coordinator is the County Fire Chief, who is assisted by an Assistant OES Coordinator. The OES Coordinator maintains the OES program for the County of Imperial. ICFD acts as the lead agency for the Imperial County Operational Area and provides leadership in all phases of developing the emergency management organization, including public education, training, Emergency Operations Center operations, interagency coordination, and plan development (Imperial County OES 2007).

The Imperial County Operational Area Emergency Operations Plan (EOP) provides a comprehensive, single source of guidance and procedures for the County to prepare for and respond to significant or catastrophic natural, environmental, or conflict-related risks that produce situations requiring coordinated response. It further provides guidance regarding management concepts relating to response and abatement of various emergency situations, identifies organizational structures and relationships, and describes responsibilities and functions necessary to protect life and property. The EOP is consistent with the requirements of the Standardized Emergency Management System (SEMS), as defined in Government Code Section 8607(a), and the U.S. Department of Homeland Security National Incident Management System (NIMS) for managing response to multi-agency and multijurisdictional emergencies. SEMS/NIMS incorporates the use of the Incident Command System, mutual aid, the operational area concept, and multi/interagency coordination (Imperial County OES 2007).

4.7 HAZARDOUS MATERIALS/PUBLIC HEALTH

Imperial County-Mexicali Emergency Response Plan

The Environmental Protection Agency's U.S.-Mexico Environmental Program (Border 2012) is a collaboration between the United States and Mexico to improve the environment and protect the health of people living along the border. The bi-national program focuses on cleaning the air, providing safe drinking water, reducing the risk of exposure to hazardous waste, and ensuring emergency preparedness along the U.S.-Mexico border. According to the EPA, rapid economic and population growth along the U.S.-Mexico border has increased the potential for hazardous waste releases and emergencies. In addition, terrorism is a growing concern for both the United States and Mexico. The ability to plan and prepare bi-nationally improves the probability of adequately responding to incidents and protecting the environment and public from exposure to harmful contaminants and possible serious environmental or health impacts. The Imperial County-Mexicali Emergency Response Plan is intended to streamline emergency response, notification, and communication efforts. The plan also guarantees cooperation among all levels of emergency response personnel. Along with the reducing risks associated with hazardous materials, the plan calls for necessary training, a crucial element in emergency response (EPA 2008).

Imperial County Air Pollution Control District

The Imperial County Air Pollution Control District (ICAPCD) has set the level of significance for carcinogenic risk to ten in one million, which is understood as the possibility of causing ten additional cancer cases in a population of one million people (ICAPCD's CEQA Air Quality Handbook, November 2007).

LOCAL

County of Imperial General Plan

The General Plan Seismic and Public Safety Element (1993) programs and policies related to the proposed project are identified below. **Table 4.7-3** summarizes the proposed project's consistency with the applicable General Plan goals and objectives. While this Draft Environmental Impact Report (Draft EIR or DEIR) analyzes the project's consistency with the General Plan pursuant to California Environmental Quality Act (CEQA) Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

**TABLE 4.7-3
PROJECT CONSISTENCY WITH GENERAL PLAN SEISMIC AND PUBLIC SAFETY ELEMENT POLICIES**

General Plan Implementation Program Policies	Consistency with General Plan	Analysis
Seismic and Public Safety Element		
Objective 8 Support the safety awareness efforts of the Office of Emergency Services of Imperial County and other agencies through public information and educational activities.	Yes	The project applicant would comply with all requirements and/or conditions of approval as deemed necessary by Imperial County and other agencies.
Goal 1: Include public health and safety considerations in land use planning.	Yes	The project applicant would comply with all requirements and/or conditions of approval as deemed necessary by Imperial County and other agencies.

Imperial County Airport Land Use Commission

In 1967, the California State Legislature authorized the creation of airport land use commissions to protect the "public health, safety, and welfare by encouraging orderly expansion of airports and the adoption of land use measures that minimizes exposure to excessive noise and safety hazards within areas around public airports to the extent that these areas are not already devoted to incompatible uses." The law requires each county's Airport Land Use Commission (ALUC) (or alternative process) to prepare an Airport Land Use Compatibility Plan (ALUCP) with a 20-year planning horizon. The primary focus of an ALUCP is on broadly defined noise and safety impacts. In addition, ALUCs make compatibility determinations for compliance of all proposed development around an airport. A local government body may override an ALUC compatibility determination for any proposed incompatible land use by a two-thirds majority vote; however, they must notify the Division of Aeronautics and the ALUC of this intent 45 days prior to approving the override (Caltrans 2009).

State airport land use commission law (Public Utilities Code Section 21676) requires a jurisdiction to either amend its general plan and other land use regulations to achieve consistency with an ALUCP adopted by an ALUC or to overrule any portion of a CLUP with which it does not agree. Any project that requires an entitlement and falls within an airport noise or safety zone will be subject to airport land use policies. Some entitlements, such as setback variances, are unrelated to the density or intensity of the proposed use. Only where the intent of the ALUC policies is violated, such as a request for use densities greater than the zoning entitlement, would the ALUC policies be invoked to deny the project.

The Imperial County Airport Land Use Commission adopted the Airport Land Use Compatibility Plan on June 5, 1991, which includes the Imperial County Airport. The Imperial County Planning and Development Services Department serves as the ALUC. The ALUCP was prepared by the ALUC under the authority of the airport land use commission law. The ALUCP sets forth the criteria and policies which the ALUC will use in assessing the compatibility between the principal airports in Imperial County and proposed land use development in the areas surrounding them. The Imperial County ALUC does not have authority over existing incompatible land uses or the operation of any airport.

The project is located approximately 1.3 miles north of the Brawley Municipal Airport. Portions of the well pad sites are located within the Airport Land Use Plan Noise Contours. On September 17, 2008, the Imperial County Airport Land Use Commission found the proposed project was consistent with the 1996 Airport Land Use Compatibility Plan.

4.7.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following State CEQA Guidelines, as listed in Appendix G. Impacts to hazardous materials and risk of upset would be significant if the project would:

- 1) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- 2) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

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- 3) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
- 4) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment.
- 5) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area.
- 6) For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area.
- 7) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- 8) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

The Notice of Preparation (NOP) and Initial Study determined that the project would have no impact relative to two significance thresholds identified above. The project site is not located within one-quarter mile of a school (the closest school to the site is 1.8 miles southwest in the City of Brawley). The project is not located on a site that is included on a hazardous materials site list as defined by Government Code Section 65962.5. As these issues were determined to have no impact in the NOP and Initial Study (**Appendix A**), they will not be discussed further in this DEIR.

METHODOLOGY

This section analyzes the impacts associated with the proposed project and the risk of upset to potential hazardous substances and/or waste contamination that may exist on the project site. This analysis is based primarily upon information obtained from the Imperial County General Plan, the CUP Application for the East Brawley Geothermal Development Project (Ormat 2010); a Phase I Environmental Site Assessment prepared by Environ International Corporation, October 2008 (**Appendix J1**); and a Phase I Environmental Site Assessment for the Former Jimenez Property, Near Brawley, prepared by Environ International, October 2009 (**Appendix J2**). The Phase I Environmental Site Assessment methodology used in preparing this section included a reconnaissance-level visit of the project site, a records review, and interviews.

PROJECT IMPACTS AND MITIGATION MEASURES

Hazard to the Public through Routine Use, Storage, or Disposal of Materials

Impact 4.7.1 Implementation of the proposed project would result in the use, storage, and disposal of hazardous materials during both construction and operation. This impact is considered **potentially significant**.

Construction

Construction of the project would involve the use, storage, and disposal of hazardous materials. During construction of the proposed project (through buildout), a limited amount of hazardous

materials would be required during all phases of construction. Heavy machinery used during site preparation would require lubrication and maintenance. Various construction-related chemicals, such as adhesives, solvents, and paints, would be used during project construction. Specifically, construction-related materials may include, but are not limited to, motor oils, canned spray paints, mastic coatings, propane and butane, paint thinners, WD-40, paints (oil-based and latex), cleaning solvents, pressurized gases, automatic transmission fluid, gasoline and diesel fuels, bottled oxygen and acetylene, lubricating grease, antifreeze, brake fluids, brazing and solder compounds, disinfectants, and hydraulic fluids. Use of these types of materials is not unusual during construction.

Storage and Operations

The project site primarily would be used as a geothermal power plant. The power plant uses three separate fluids (geothermal brine, isopentane motive fluid, and cooling water), which flow through six Ormat Energy Converters (OEC). OEC units would be able to operate independently but would share common ancillary components such as isopentane storage, geothermal brine supply and injection, and the electrical substation.

Isopentane is a hazardous substance that is subject to various federal regulations. An off-site consequence analysis has been prepared for the project (see **Appendix J3**) that addresses the potential hazards associated with a release of isopentane from the power plant site. Isopentane is an extremely volatile and extremely flammable liquid at room temperature and pressure. The normal boiling point is just a few degrees above room temperature, and isopentane will readily boil and evaporate away on a warm day. Isopentane is commonly used in conjunction with liquid nitrogen to achieve a liquid bath temperature of -160°C (degrees Celsius). Isopentane is subject to the federal Risk Management Program (RMP) contained in Title 40 of the Code of Federal Regulations (CFR), Part 68; the California Accidental Release Prevention (CalARP) Program contained in Title 9, Division 2, Chapter 4.5 of the California Code of Regulations (CCR); and the Hazardous Materials Business Plan requirements in Title 9, Division 2, Chapter 4, Article 4 of the CCR. Isopentane would also be handled in amounts that exceed the threshold quantity established by the Occupational Health and Safety Administration (OSHA) Process Safety Management Program found in 29 CFR Part 1910.1200 (Ormat 2008, Appendix B, p. 1).

The federal RMP and CalARP threshold quantity for flammable substances such as isopentane is 10,000 pounds (1,923 gallons). At the East Brawley project, each of the six integrated two-level OEC units would contain 11,000 gallons of isopentane in the Level 1 systems and 12,000 gallons in the Level 2 systems. Isopentane would also be stored in two 11,888-gallon storage tanks on-site (Ormat 2008, Appendix B, p. 1).

The isopentane systems at the proposed power plant would consist of the two isopentane loops (the vaporizers, turbines, condensers, and preheaters) in the individual OEC units and the evacuation/vapor recovery systems, transfer pumps, process piping, and storage tanks used to transfer and store isopentane during OEC unit maintenance. Isopentane would be used as the working fluid in the OEC unit turbines, heated by geothermal fluids in heat exchange processes and cooled in the condensers. The isopentane systems would be closed systems, periodically recharged to make up for losses from fugitives and when the OEC units are purged or opened for maintenance (Ormat 2008, Appendix B, p. 2).

The isopentane systems at the proposed project would consist of the two isopentane loops in each of the individual OEC units. The isopentane loops in the individual OEC units consist of the major vessels in the OEC units: the vaporizers, turbines condensers, diffusers, and preheaters. Each level of each OEC unit is a separate isopentane loop. Although valves allow these vessels

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to be isolated for maintenance, the valves are normally kept open, allowing the working fluid to flow through the loop and generate electricity. Thus, the worst-case analysis assumes that the entire contents of a single loop of a single OEC unit are released (Ormat 2008, Appendix B, p. 2).

The single largest isopentane loop at the proposed East Brawley Geothermal Development project would be the Level 2 loop in each OEC unit. The worst-case release involves the release of isopentane from any of the six 12,000-gallon horizontal Level 2 loops in the six OEC units in a ten-minute period. The total amount of isopentane released from a Level 2 OEC unit loop would be the entire 12,000 gallons (62,400 pounds). In accordance with the RMP guidance, the worst-case analysis was evaluated for a vapor cloud explosion. The EPA model RMP*Comp was used to calculate the maximum distance in which an overpressure of 1.0 pound per square inch (psi) would occur, the endpoint established by the federal regulations for flammable gases. A liquid temperature of 290°F (degrees Fahrenheit) was assumed, the highest temperature in the isopentane cycle. The model estimated the 1.0 psi overpressure distance to be 0.3 miles (0.5 kilometers). Refer to Figure 2 of the off-site consequences analysis to determine the extent of the impact area for each of the six Level 2 loops (Ormat 2008, Appendix B, p. 2).

The 0.3-mile (0.5-kilometer) worst-case impact zones would be centered on each of the Level 2 OEC unit loops at the proposed power plant site and would extend out into the agricultural area surrounding the power plant, including the applicant's office/control room/shop building at the power plant site and the two nearest residences located immediately adjacent (east and south) to the power plant site. The worst-case vapor cloud explosion would not affect any schools or other sensitive receptors. The project applicant will relocate the residences immediately south and east of the power plant site prior to the start-up of the power plant.

All of the plans required by both the federal and state government for the storage and use of isopentane will be complete by the time the isopentane is delivered as required to comply with the various regulations.

Hazardous materials would be used and disposed of during construction (e.g., fuel, oil, paint). While these items would not be stockpiled on-site in large amounts, potential exists for spills and releases. The proposed project will include staging areas where materials will be stored during construction. All allowable uses of hazardous material would be subject to compliance with federal and state permit requirements, as described in Regulatory Framework, above. As during construction, hazardous materials regulations codified in CCR Titles 8, 22, and 26 would be implemented during project operations and would be monitored by the State (Cal/OSHA in the workplace, DTSC for hazardous waste, and CHP for transport) and/or local jurisdictions. Proposed project operations would be required to comply with CalEPA's Unified Program, which would be managed by the Imperial County Certified Uniform Program Agency (CUPA), in accordance with the regulations included in the Unified Program (e.g., hazardous materials release response plans and inventories, California Accidental Release Prevention (CalARP), California UFC hazardous material management plans and inventories). Such compliance will reduce the potential risk of exposure associated with the accidental release of hazardous materials. In addition, CCR Title 26, Division 6, which will be monitored by the CHP on off-site state highways and the County of Imperial Fire Department elsewhere, requires strict adherence to regulations designed to prevent leakage and spills of material in transit and provides detailed information to cleanup crews in the event of an accident. Cal/OSHA workplace regulations address the use, storage, and disposal of hazardous materials (CCR Title 8), and compliance with these regulations would be monitored by the CUPA during flammable and hazardous materials storage inspections and by compliance audits and reporting to local and state agencies.

Implementation of the workplace regulations would further reduce the potential for hazardous materials releases. Standards are established in 49 CFR 171–180 by which hazardous materials would be transported within and adjacent to the proposed project site and how spills would be prevented, cleaned, and/or managed. Required compliance with these regulations would reduce the potential for accidental release during operation and maintenance of the proposed project or by transporters delivering hazardous materials to the project site or picking up hazardous waste, including petroleum-based products.

As described above, the proposed project would be required to comply with all applicable federal, state, and local regulations pertaining to safe-transit practices, workplace safety, spill prevention, and other hazardous materials-related concerns. The CUPA and other agencies would be required to enforce compliance, including issuing permits and tracking and inspecting hazardous materials transportation and storage.

However, the risk of exposure to hazardous materials could be further reduced with development of a Hazardous Materials Business Plan, which includes an Emergency Response Plan. Impacts associated with use, storage, and disposal of hazardous materials are **potentially significant**.

Mitigation Measures

MM 4.7.1a A comprehensive Hazardous Materials Business Plan shall be prepared for the project in accordance with the California Accidental Release Prevention Program. The Hazardous Materials Management Plan (HMMP) shall include (1) an Inventory and Site Map, (2) an Emergency Response Plan (ERP) and Owner/Operator Identification, and (3) employee training.

The HMMP will be prepared and submitted to the California Department of Toxic Substances Control (DTSC), as the Certified Unified Program Agency (CUPA) for Imperial County. The HMMP will be maintained and revised as necessary.

The project shall comply with all federal, state, Imperial County, and fire district requirements for temporary storage of flammable/combustible materials at construction sites. The proposed project shall include staging areas where materials shall be stored during construction.

Timing/Implementation: Prior to issuance of a recoded conditional use permit

Enforcement/Monitoring: Imperial County Planning and Development Services Department, Imperial County Fire Department, and California Department of Toxic Substances Control (DTSC), as the Certified Unified Program Agency (CUPA) for Imperial County

MM 4.7.1b A comprehensive Emergency Response Plan (ERP) shall be prepared for the East Brawley Geothermal Development project. Local emergency response providers shall be consulted regarding the Emergency Response Plan (ERP) and shall be provided copies of the document for their review. Approval of this ERP will be required by the Imperial County Sheriff's Office, Imperial

4.7 HAZARDOUS MATERIALS/PUBLIC HEALTH

County Office of Emergency Services, Imperial County Fire Department, Imperial County Department of Public Health, California Highway Patrol, and Caltrans prior to the commencement of site operations. The ERP shall address potential safety hazards associated with the project and identify public safety hazards that can be reduced or eliminated through specific protocols. The ERP also shall provide an overview of general procedures required to protect people and property during an emergency or disaster situation. The intent of the ERP is to establish a clear understanding of responsibilities for first responders, sheriff and police, local fire departments, emergency medical service agencies, and management of staff during an emergency situation.

The ERP shall identify and assign personnel to various emergency tasks and responsibilities, thus creating a site emergency team. The ERP shall describe the emergency management procedures to cover possible emergencies (i.e., well blowouts, major fluid spills, earthquakes, etc.). There shall be at least one employee on call at all times (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility of coordinating all emergency response measures. The on-call emergency coordinator would be familiar with the ERP and would have the authority to commit the resources needed to carry out the contingency plan. Additionally, the ERP shall include designated assignments for on-site personnel, details of each position's responsibilities, procedures for coordination with outside resources, and establishment of a chain of command to take precedence in emergencies.

The Emergency Response Plan shall be updated annually in coordination with the Imperial County Fire Department, the Imperial County Public Health Department, the Imperial County Certified Unified Program Agency, and the Imperial County Office of Emergency Services.

Timing/Implementation: *Prior to issuance of a recoded conditional use permit*

Enforcement/Monitoring: *Imperial County Department of Planning and Development Services*

Implementation of mitigation measures **MM 4.7.1a** and **MM 4.7.1b** would reduce hazardous material/risk of upset impacts to **less than significant**.

Transport of Hazardous Substances

Impact 4.7.2 Implementation of the proposed project would require the transport of various substances, some of which are flammable. This transport could pose a significant hazard should an accident involving the substances occur. This impact is considered **less than significant**.

Project-related documents show that the project would not involve the routine transport to and from the site of bulk quantities of the binary working fluid, isopentane, which will be stored in pressure vessels and bulk storage containers on the power plant site.

Project-related documents state that there are numerous engineering, fire-control, and safety measures have been integrated into the project to prevent releases of isopentane, prevent fires,

and respond to and control fires and other emergencies. Each production well pad will have corrosion inhibitor that will be labeled and have secondary containment. The project would also conform to federal and state hazardous materials handling and storage requirements. These substances would be considered flammable and represent a potentially significant hazardous condition when used or transported to the facility.

Transportation of hazardous materials is heavily regulated by both federal and state agencies. The proposed project would be required to comply with regulations on transportation of hazardous materials codified in 49 CFR 173 and 49 CFR 177 and CCR Title 26, Division 6. Primary control of hazardous materials to and from the proposed project site lies with the California Highway Patrol (CHP), as much of the materials required for construction and operation of the proposed project would likely travel along State Route 78 and State Route 111. Any vendor transporting such materials to the project site must have a hazardous materials transportation license (either temporary or otherwise) from the CHP. As part of the licensing process, the vendor's equipment and methods would be inspected by the CHP, and the vendor would be informed of the proper routes to and from the project site. Beyond the CHP license, transportation of hazardous materials would be required to follow all applicable federal and state laws regarding such transport, including the requirements of the U.S. Department of Transportation and Caltrans. Transport and sale of any hazardous materials for the proposed project would relate to construction materials and gasoline and propane, along with other hazardous substances to be used in the operations of the project.

Transportation of hazardous materials to and from the project site as a result of construction and operation of the proposed project would be required to follow all applicable federal, state, and local laws and regulations. Transportation would be subject to licensing and inspection by the CHP. Therefore, the proposed project would have a **less than significant** impact to the transportation of hazardous materials.

Mitigation Measures

None required.

Accidental Release of Hazardous Materials

Impact 4.7.3 Implementation of the proposed project may create a significant hazard to the public or environment in the event of an accident involving the release of hazardous materials into the environment. This impact is considered **less than significant**.

The proposed project would include the use of isopentane, which as discussed above is a hazardous substance that is an extremely volatile and extremely flammable liquid at room temperature. As discussed under Impacts 4.7.1 and 4.7.2, the transportation, use, storage, and disposal of hazardous materials is strictly regulated by various state and federal agencies. Thus, the possibility of a spill or leak at any given time is slight. In the event of a hazardous material leak or spill, the Imperial County Fire Department would respond to manage the emergency. The proximity of the nearest fire station and the approximate response time is addressed in Section 4.11, Public Services, of this DEIR. All handling and storage of hazardous materials would be pursuant to federal and state regulations. Additionally, the project would be required to prepare a comprehensive Hazardous Materials Management Plan as described in mitigation measure **MM 4.7.1a** and an Emergency Response Plan as described in mitigation measure **MM 4.7.1b**. With implementation of mitigation measures **MM 4.7.1a** and **MM 4.7.1b**, impacts involving

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hazardous materials released during construction, transportation, or operations are considered **less than significant**.

Mitigation Measures

None required.

Public Airport Impacts

Impact 4.7.4 The nearest airport is approximately 1.3 miles from the project site. The project is not located within the flight path. The airport activities do not present a hazard to the proposed project's employees. However, future drilling wells may be located closer to the airport. This impact is considered **potentially significant**.

The Brawley Municipal Airport is located approximately 1.3 miles south of the proposed project site. Brawley Municipal Airport covers 160 acres and has one runway. It is mostly used for general aviation purposes. The Federal Aviation Administration issued a Determination of No Hazard to Air Navigation for the drilling of the initial six exploration wells. Other wells that may be drilled closer to the airport will have similar notices of proposed temporary construction filed with the Federal Aviation Administration as required.

On September 17, 2008, the Imperial County Airport Land Use Commission found the proposed project to be consistent with the 1996 Airport Land Use Compatibility Plan.

Mitigation Measures

MM 4.7.4 For future drilling activities within the East Brawley Geothermal Development project area, the project applicant(s) shall receive a Determination of No Hazard to Air Navigation from the Federal Aviation Administration for the drilling of additional wells.

Timing/Implementation: *Prior to issuance of conditional use permits for the wells*

Enforcement/Monitoring: *Project applicant; Imperial County Planning and Development Services Department*

Implementation of mitigation measure **MM 4.7.4** would reduce future well drilling activities and their siting near airport activities to **less than significant**.

Private Airport Impacts

Impact 4.7.5 The project is not located near a private airstrip. Therefore, implementation of the proposed project would not result in a safety hazard for people residing or working in the project area. This is **no impact**.

The project site is not located in the vicinity of a known private airstrip. The project has no potential to result in a safety hazard for people residing or working in a project area located in the vicinity of a private airstrip. Therefore, there are **no impacts**.

Mitigation Measures

None required.

Interfere with Emergency Plans

Impact 4.7.6 Implementation of the proposed East Brawley Geothermal Development project would lead to increases in demand for fire and police services, as discussed in Section 4.11, Public Services. Since these agencies are responsible for the planning and implementation of the Imperial County Emergency Operations Plan (EOP), the proposed project could lead to a **less than significant** impact.

There are no known public emergency action or evacuation plans applicable to the area. A detailed discussion of increases to services provided by the Imperial County Fire Department (ICFD) and the Sheriff's Office is provided in Section 4.11, Public Services. As previously discussed, the ICFD serves as the local Office of Emergency Services in Imperial County. Although there is a potential for impacts to the provision for emergency services, as indicated in mitigation measure **MM 4.7.1b**, the proposed project would be required to prepare an Emergency Response Plan (ERP). The ERP would address potential safety hazards associated with the project and identify public safety hazards that can be reduced or eliminated through specific on-site protocols. The ERP would be required to be approved by the Sheriff's Office, the Office of Emergency Services, and the Fire Department. Additionally, the proposed project will have its own emergency access in case evacuations are ever necessary.

Upon implementation of mitigation measures **MM 4.7.1b**, impacts related to the Imperial County EOP would be **less than significant**.

Mitigation Measures

None required.

Threat of Wildland Fire

Impact 4.7.7 The project site is located in a relatively rural area. However, most of the site is currently irrigated for agricultural production or is fallow with little vegetation present. Therefore, the threat of wildland fire on the project site is considered a **less than significant** impact.

As shown in **Figure 3.0-2**, the project site is located in an agricultural area of the county. A majority of the surrounding land uses are undeveloped agricultural fields that rotate by season and other factors between active and fallow. Wildland fire is typically associated with areas covered with woodland, grasses, or otherwise heavily vegetated. When actively farmed, the surrounding agricultural fields are irrigated and pose no threat of wildland fire. When fallow, these fields are bare or partially covered with ruderal vegetation such as bermuda grass. Although these fields may contain some dry grasses, they are surrounded by irrigated fields and canals and are considered at low threat of wildland fire. This impact is considered to be **less than significant**.

Impacts associated with fire protection services are discussed in Section 4.11, Public Services, of this DEIR.

4.7 HAZARDOUS MATERIALS/PUBLIC HEALTH

Mitigation Measures

None required.

4.7.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for hazards associated with the proposed project includes proposed, planned, approved, or reasonably foreseeable projects in Imperial County, including the list of projects in **Table 4.0-1** in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this DEIR. The cumulative setting also includes the existing uses. In the case of an accident, the Imperial County Fire Department/Office of Emergency Services indicated that the likely effect of the proposed project would be to increase response times due to the potential for simultaneous calls (OES 2007).

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Hazardous Materials and Public Health Impact

Impact 4.7.8 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could increase the risk of public exposure to hazardous materials. This is considered a **less than cumulatively considerable** impact.

The cumulative effects from ongoing development in the project area could create a risk to public health associated with exposure to hazardous materials (chemicals, herbicides, etc.). Impacts associated with hazardous materials are generally site-specific, and each individual project is responsible for mitigating its specific risks. As discussed above under Impact 4.7.1, the project site would be required to prepare an ERP for geothermal power plant facility operations. Additionally, the project applicant would be required to pay fees that would offset the project's impacts for increased demand for fire and emergency services as determined appropriate by the Imperial County Fire Department (mitigation measure **MM 4.11.1-2**).

Mitigation Measures

No additional mitigation is required.

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4.8 HYDROLOGY AND WATER QUALITY

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) discusses and analyzes the surface hydrology, groundwater, and water quality characteristics of the proposed East Brawley Geothermal Development project including both the Brawley Wastewater Treatment Plant (BWWTP) water supply and the Imperial Irrigation District (IID) water supply. The site-specific information provided in this section is based on the letter report prepared for the proposed project by Development Design and Engineering Inc. (2009) (**Appendix F**), the Geotechnical Investigation, East Brawley Geothermal Plant (Black Eagle Consulting 2008), and the East Brawley Conditional Use Permit Application (Ormat 2010). Regional information is based on the Imperial County General Plan (1993, amended 2008), the Water Quality Control Plan for the Colorado River Basin, Region 7 (SWRCB 2006), and the State of California's California Watershed Portal website (2009).

4.8.1 EXISTING SETTING

REGIONAL SETTING

Regional Surface Hydrology

The proposed project is located within the boundaries of the Regional Water Quality Control Board's Colorado River Basin Plan (SWRCB 2006). The Colorado River Basin Region covers approximately 13 million acres (20,000 square miles) in the southeastern portion of California. It includes all of Imperial County and portions of San Bernardino, Riverside, and San Diego counties. It is bounded for 40 miles on the northeast by the State of Nevada, on the north by the New York, Providence, Granite, Old Dad, Bristol, Rodman, and Ord mountain ranges, on the west by the San Bernardino, San Jacinto, and Laguna mountain ranges, on the south by the Republic of Mexico, and on the east by the Colorado River and State of Arizona. Geographically, the region represents only a small portion of the total Colorado River drainage area, which includes portions of Arizona, Nevada, Utah, Wyoming, Colorado, New Mexico, and Mexico. A significant geographical feature of the region is the Salton Trough, which contains the Salton Sea and the Coachella and Imperial valleys. The two valleys are separated by the Salton Sea, which covers the lowest area of the depression. The trough is a structural extension of the Gulf of California. In prehistoric times, it contained the ancient Lake Cahuilla (not to be confused with the present Lake Cahuilla which is located at the terminus of the Coachella Branch of the All-American Canal) (SWRCB 2006).

Much of the agricultural economy and industry of the region is located in the Salton Trough region. There are also industries associated with agriculture, such as sugar refining. During the past several years, there has been increasing development of geothermal industries. In the future, agriculture is expected to experience little growth in the Salton Trough, but there will likely be increased development of other industries (e.g., construction, manufacturing, and services). The present Salton Sea, located on the site of a prehistoric lake, was formed between 1905 and 1907 by overflow of the Colorado River. Today, it serves as a drainage reservoir for irrigation return water and stormwater from the Coachella Valley, Imperial Valley, and Borrego Valley and also receives drainage water from the Mexicali Valley in Mexico. The Salton Sea is California's largest inland body of water and it provides very important wildlife and sport fishery habitat (SWRCB 2006).

Developments along California's 230-mile reach of the Colorado River, which flows along the eastern boundary of the region, include agricultural areas in Palo Verde Valley and Bard Valley, the urban centers at Needles, Blythe, and Winterhaven, several transcontinental gas compressor stations, and numerous small recreational communities. Some mining operations are located in

4.8 HYDROLOGY AND WATER QUALITY

the surrounding mountains. Also, the Fort Mojave, Chemehuevi, Colorado River, and Yuma Indian Reservations are located along the river (SWRCB 2006).

The mountains of the region consist mainly of metamorphic and igneous rocks of pre-Cambrian to Tertiary age, and the sediments in the intervening valleys are generally weakly consolidated to unconsolidated sediments of late Cenozoic age. Northwest-trending faults are extensive and are a major factor in determining the configuration of the land. The well-known San Andreas Fault zone cuts diagonally across the southwesterly portion of the region and borders the highlands on the northeast side of the Salton Trough. Borrego Valley is a typical valley formed by the San Jacinto Fault. The valleys, mountains, and dry lakes generally trend toward the northwest as oriented by the major fault systems. The Coachella and Imperial valleys were created when the Colorado River formed a delta that isolated the Salton Trough from the Gulf of California. Subsequently, under desert conditions, the inland sea dried up. Later, the trough was occupied by lakes for various periods, and deposition into these lakes gives the valleys their characteristic flat lands and fertile soils. The East Colorado River Basin planning area consists of a sediment-filled structural trough. Deep alluvial deposits composed of silt, clay, and sand were laid down by ancestral streams of the present Colorado River system (SWRCB 2006).

The Colorado River is the most important waterway in the region. The river supplies water for use within the region and elsewhere. Regional drainage to the river is from a strip approximately 200 miles long; with a watershed that (in California) ranges from 7 to 40 miles in width. This watershed strip is referred to as the East Colorado River Basin. Near Parker Dam, water is diverted by the Los Angeles Metropolitan Water District for export through the Colorado River Aqueduct to coastal counties. The dam forms Lake Havasu, a major recreational development. At Palo Verde Diversion Dam, water is diverted for irrigation in Palo Verde Valley. At Imperial Dam, water is diverted to the All-American Canal, which conveys water in California to the Bard Valley and to the agricultural areas of the Imperial and Coachella valleys. Apportionment of water available for diversion from the Colorado River is made in accordance with a number of documents collectively referred to as the Law of the River. These documents include interstate compacts, federal legislation, water delivery contracts, state legislation, a treaty with Mexico, United States Supreme Court decrees, and federal administrative actions. Presently, California is receiving waters unused by other states. When Arizona is diverting its full apportionment, it is anticipated that there will be only infrequent periods of surplus, and California's diversions will be limited to its basic apportionment of 4.4 million acre-feet per year (SWRCB 2006).

Regional drainage waters resulting from Colorado River diversions and use, and which do not return to the Colorado River, drain into the Salton Sea. The portion of the region that does not drain into the Colorado River is referred to as the Colorado River Basin (West), or West Basin. Much of the northern portion of the West Basin drains to several individual internal sinks or playas, while the southern portion generally drains to the Salton Sea. The Imperial and Coachella valleys contain numerous drains that transport irrigation return flows and stormwater, as well as canals for importation and distribution of Colorado River water. The Salton Sea, which is replenished principally by irrigation drainage and stormwater, is the largest body of water in the West Basin. The Salton Sea serves as a reservoir to receive and store agricultural drainage and seepage waters, but also provides important wildlife habitat and is used for recreational purposes, which include boating and fishing. Several smaller constructed recreational lakes are located in the Imperial Valley. In addition, Lake Cahuilla in Coachella Valley is used to store Colorado River water for irrigation and recreational purposes (SWRCB 2006).

Within the East Colorado Basin Plan, the proposed project site is located in the Imperial Valley Planning Area. This planning area comprises 2,500 square miles in the southern portion of the region, almost all of it in Imperial County. The eastern and western boundaries are contiguous with the western and eastern boundaries of the East Colorado River Basin and the Anza-Borrego

Planning Area, respectively. Its northern boundary is along the Salton Sea and the Coachella Valley Planning Area, and its southern boundary follows the international boundary with Mexico.

The planning area's central feature is the flat, fertile Imperial Valley. The principal communities are El Centro, Brawley, Imperial, Holtville, and Calexico. Within the Imperial Valley Planning Area, surface waters drain primarily toward the Salton Sea (SWRCB 2006).

The proposed project site is also defined by watershed locations. The site is located within the Colorado River hydrologic region, the Imperial hydrologic unit, and is fully contained within the Brawley hydrologic area (see **Figure 4.8-1**). The Brawley watershed is bounded by the Chocolate Mountains to the north, Algodones Dune to the east, Mexico to the south, and Salton Sea, West Mesa, Coyote Mountains, and Yuha Basin to the west.

Regional Surface Water Quality

The proposed project falls within the boundaries of the Regional Water Quality Control Board's (RWQCB; Regional Board) Colorado River Basin Plan. The intent of the Basin Plan is to provide definitive guidelines and give direction to the full scope of RWQCB activities that serve to optimize the beneficial uses of the state waters within the Colorado River Basin Region of California by preserving and protecting the quality of these waters. The RWQCB implements the Basin Plan by issuing and enforcing waste discharge requirements to persons, which can include individuals, communities, or businesses whose waste discharges may affect water quality. These requirements can be either state Waste Discharge Requirements for discharge to land or federally delegated National Pollutant Discharge Elimination System permits for discharges to surface water. Dischargers are required to meet water quality objectives and thus protect beneficial uses (SWRCB 2006).

Division 7 of the California Water Code (also known as the Porter-Cologne Water Quality Control Act) requires the Regional Board to consider past as well as present and probable future beneficial uses when establishing water quality objectives. Beneficial water uses are of two types – consumptive and non-consumptive. Consumptive uses are those normally associated with people's activities, primarily municipal, industrial, and irrigation uses that consume water and cause corresponding reduction and/or depletion of water supply. Non-consumptive uses include swimming, boating, waterskiing, fishing, hydropower generation, and other uses that do not significantly deplete water supplies (SWRCB 2006).

Surface waters within the Imperial Valley Planning Area mostly drain toward the Salton Sea. The New River and Alamo River convey agricultural irrigation drainage water from farmlands in the Imperial Valley, surface runoff, and lesser amounts of treated municipal and industrial wastewaters from the Imperial Valley. The flow in the New River also contains agricultural drainage, treated and untreated sewage, and industrial waste discharges from Mexicali, Mexico (SWRCB 2006).

Regional Groundwater Hydrology

Within the Imperial Valley Planning Area, groundwater is stored in the Pleistocene sediments of the valley floor, the mesas on the west, and the East Mesa and sand hills on the east. However, the fine-grained lake sediments in the central portion of the Imperial Valley inhibit groundwater movement, and tile-drain systems are utilized to dewater the sediments to a depth below the root zone of crops and to prevent the accumulation of saline water on the surface. Few wells have been drilled in these lake sediments because the yield is poor and the water is generally saline. The few wells in the valley are for domestic use only. In the Coyote Wells Hydrologic Subunit and Davies Hydrologic Unit, which are at higher elevations, the water yield from wells is

4.8 HYDROLOGY AND WATER QUALITY

higher and the waters are of lower salt concentration. Groundwater is the main water supply in those areas. Factors that diminish groundwater reserves are consumptive use, evapotranspiration, evaporation from soils where groundwater is near the surface, and losses through outflow and export (SWRCB 2006).

The proposed project area is located in the Imperial Valley Groundwater Basin as defined in the State of California's Bulletin 118 (DWR 2003). The Imperial Valley Groundwater Basin is bounded on the east by the Sand Hills and on the west by the impermeable rocks of the Fish Creek and Coyote mountains. To the north, the basin is bounded by the Salton Sea, which is the discharge point for groundwater in the basin. The physical groundwater basin extends across the border into Baja California, where it underlies a contiguous part of the Mexicali Valley. However, in the Department of Water Resources Bulletin 118 report, the southern boundary of the Imperial Valley basin is defined politically as the international border with the Republic of Mexico. Major hydrologic features include the New and Alamo rivers, which flow north toward the Salton Sea. The rivers were formed in the mid to late 1800s when the Colorado River occasionally escaped the normal channel and flowed northward toward the present-day Salton Sea. The All-American Canal (three branches) and the Coachella Canal also cross over the basin.

Project Setting

The project site is located in the Brawley hydrologic area of the Imperial hydrologic unit in the Imperial Valley Planning Area (see **Figure 4.8-1**). According to the Region 7 Basin Plan, surface water drains into the Salton Sea from most of the Imperial Valley Planning Area, including waters in the vicinity of the proposed project site. Surface water flow is generally limited to irrigation return flow and some minor stormwater runoff immediately following infrequent rain events. Surface waters in the project vicinity include the Salton Sea, the New River, the Alamo River, and various agricultural canals. The closest surface waters to the proposed project site are the canal drain system and the New River (DOC, 2009). Existing beneficial uses of New River waters include Freshwater Replenishment (FRSH), Water Contact Recreation (REC 1), Non-contact Water Recreation (REC II), Warm Freshwater Habitat (WARM), Wildlife Habitat (WILD), and Preservation of Rare, Threatened, or Endangered Species (RARE). The potential beneficial use of the New River is Industrial Service Supply (IND) (SWRCB 2006).

The CWA Section 303(d) List of Impaired Water Bodies identifies surface water bodies that do not meet water quality standards even though water pollution controls are in effect. In the project area, the New River, Alamo River, and Salton Sea are listed as CWA Section 303(d) impaired water bodies. The 303(d) listing for the New River is for multiple contaminants including, but not limited to, chlordane, chlorpyrifos, copper, DDT, diazinon, dieldrin, hexachlorobenzene, mercury, nutrients, organic enrichment/low dissolved oxygen, polychlorinated biphenyls (PCBs), p-dichlorobenzene, selenium, toxaphene, toxicity, and trash. The Salton Sea, into which the New River drains, is listed for multiple contaminants as well including, but not limited to, nutrients, salts, selenium, arsenic, chlorpyrifos, DDT, diazinon, and enterococcus. The following pollutants and stressors have been identified for the Alamo River: chlordane, chlorpyrifos, DDT, diazinon, dieldrin, endosulfan, enterococcus, E. coli, mercury, PCBs, selenium, and toxaphene (CRBRWQCB 2008).

According to the geotechnical investigation for the geothermal plant, the site is essentially flat and without existing structures. The regional ground surface slopes toward the northeast at 12 feet per mile, or a 0.2 percent gradient. A grid network of drainpipes may underlie the site; a 3-inch-diameter, thin-wall perforated polyvinyl chloride (PVC) drainpipe in a coarse sand envelope was encountered at 5.5 feet below surface during excavation of a test pit (Black Eagle 2008, p. 3).

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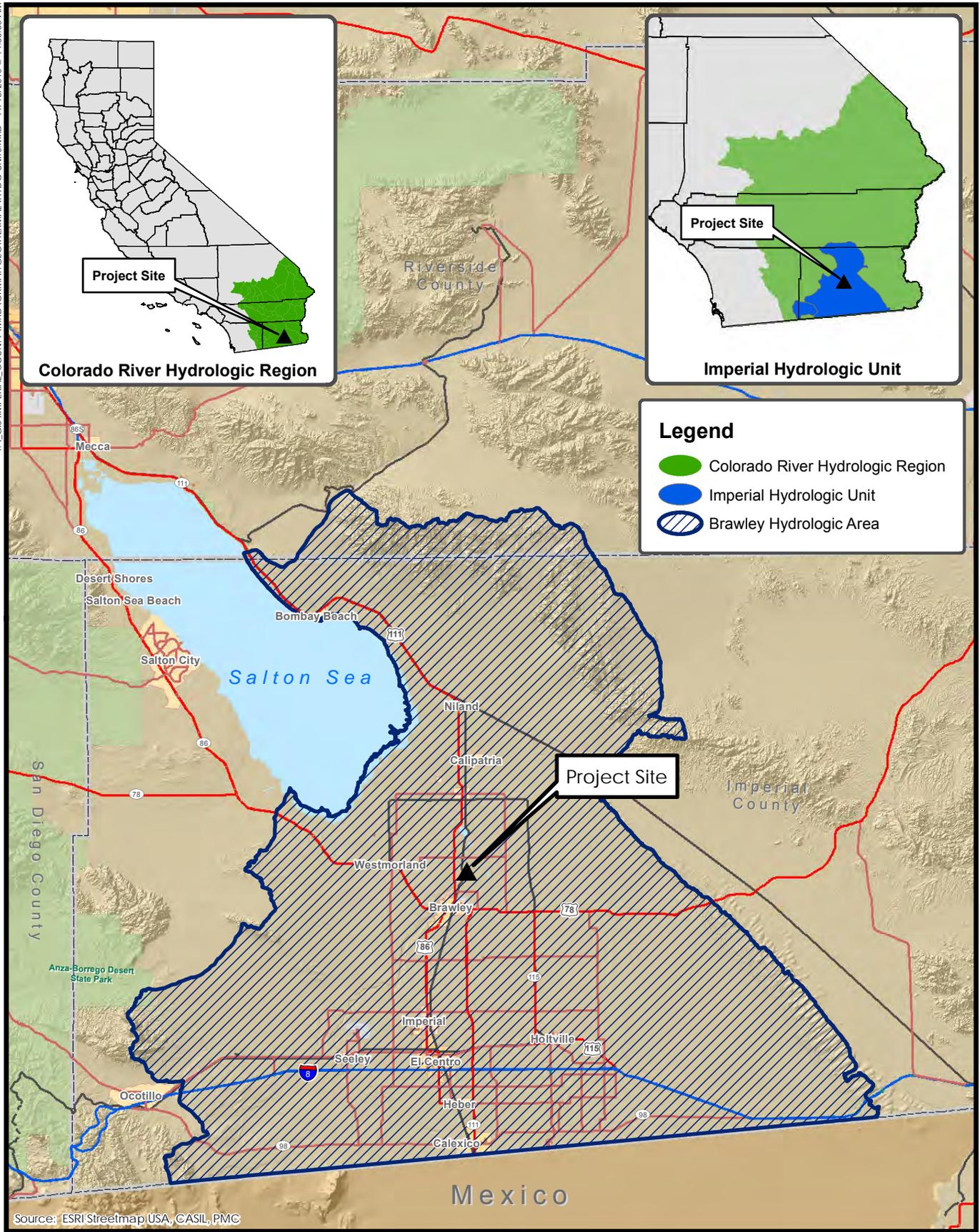


Figure 4.8-1
Hydrologic Area Map



The geotechnical study describes the site as underlain by laterally continuous moderately to thickly bedded fat to lean clays with occasional moderately bedded silty sand and silt layers to at least 60 feet depth. The geotechnical investigations found a ½- to 1½-foot-thick silt layer encountered within medium plasticity clay at depths ranging from 5 to 6½ feet below surface. Silty sand was also recorded at depths ranging from 4½ to 7 feet. An approximately 8- to 9-foot-thick silt layer was encountered starting at approximately 15 to 17 feet below surface (Black Eagle 2008, p. 8). Groundwater depth coincided with the upper surface of the silty sand layer at 15 to 17 feet below surface (Black Eagle 2008, p. 8). The cone penerometer test (CPT) pore pressure dissipation test indicated groundwater is at 10.6 feet depth (Black Eagle 2008, p. 8).

Precipitation

Within the Imperial Valley Planning Area, average annual precipitation ranges from less than 3 inches over most of the Planning Area to about 8 inches in the Coyote Mountains on the western border (SWRCB 2006).

Flooding

The proposed project site lies on the boundary of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Imperial County, California, and Incorporated Areas, Map Number 06025C1025C. This panel shows the proposed project site lying entirely within Zone "X – Other Areas determined to be outside 0.2% annual chance floodplain," outside of the 100-year floodplain (FEMA 2009).

Groundwater Quality

In the central part of Imperial Valley, the groundwater is of a higher salinity. Most wells have total dissolved solids concentrations of between 1,000 and 3,000 milligrams per liter (mg/L). The ionic composition of the water in the central part of the valley is similar to that of the East Mesa. However, as the total dissolved solids concentration increases, the ionic composition becomes more dominated by sodium chloride. The pH of these waters is usually slightly basic, with an occasional value less than 7 (CRWQCB 2008).

4.8.2 REGULATORY FRAMEWORK

FEDERAL

Clean Water Act

The Clean Water Act (CWA) is the primary federal law that protects the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. It operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. The following paragraphs provide additional details on specific sections of the CWA.

CWA Permits for Stormwater Discharge

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, administered by the U.S. Environmental Protection Agency (EPA). In California, the State Water Resources Control Board (SWRCB) is authorized by the EPA to oversee the NPDES program through the Regional

4.8 HYDROLOGY AND WATER QUALITY

Water Quality Control Boards (see related discussion under Porter-Cologne Water Quality Control Act, below). The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits.

List of Impaired Water Bodies

Under CWA Section 303(d) and California's Porter-Cologne Water Quality Control Act of 1969 (discussed below), the State of California is required to establish beneficial uses of state waters and to adopt water quality standards to protect those beneficial uses. Section 303(d) establishes the Total Maximum Daily Load (TMDL) process to assist in guiding the application of state water quality standards, requiring the states to identify streams whose water quality is impaired (affected by the presence of pollutants or contaminants), and to establish the TMDL or the maximum quantity of a particular contaminant that a water body can assimilate without experiencing adverse effects.

Federal Emergency Management Agency

Imperial County is a participant in the National Flood Insurance Program (NFIP), a federal program administered by the Federal Emergency Management Agency (FEMA). Participants in the NFIP must satisfy certain mandated floodplain management criteria. The National Flood Insurance Act of 1968 has adopted, as a desired level of protection, an expectation that developments should be protected from floodwater damage of the Intermediate Regional Flood (IRF). The IRF is defined as a flood that has an average frequency of occurrence on the order of once in 100 years, although such a flood may occur in any given year. The County is occasionally audited by the Department of Water Resources to ensure the proper implementation of FEMA floodplain management regulations.

STATE

Department of Water Resources

Major responsibilities of the Department of Water Resources (DWR) include preparing and updating the California Water Plan to guide development and management of the state's water resources, and planning, designing, constructing, operating, and maintaining the State Water Resources Development System. In addition, DWR cooperates with local agencies on water resources investigations, supports watershed and river restoration programs, encourages water conservation, explores conjunctive use of ground and surface water, facilitates voluntary water transfers, and, when needed, operates a state drought water bank.

Porter-Cologne Water Quality Control Act and Waste Discharge Permits

Senate Bill 227, also known as the Porter-Cologne Water Quality Control Act (Porter-Cologne), governs the coordination and control of water quality in the state, and includes provisions relating to non-point source pollution. The State Water Resources Control Board has the ultimate authority over state water rights and water quality policy. Porter-Cologne also establishes nine Regional Water Quality Control Boards (RWQCBs) to oversee water quality on a day-to-day basis at the local/regional level. The Colorado River Basin RWQCB, Region 7, oversees the Imperial Valley area.

California State Water Resources Control Board

The California State Water Resources Control Board and RWQCBs enforce State of California statutes that are equivalent to or more stringent than the federal statutes. RWQCBs are responsible for establishing water quality standards and objectives that protect the beneficial uses of various waters, including the New and Alamo rivers and the canal system in the Imperial Valley Planning Area. In the Imperial Valley Planning Area, the RWQCB is responsible for protecting surface water and groundwater from both point and non-point sources of pollution. Water quality objectives for all of the water bodies within the Planning Area were established by the RWQCB and are listed in its Basin Plan.

The Basin Plan was prepared in accordance with criteria contained in the California Porter-Cologne Water Quality Control Act, the federal Clean Water Act, and other pertinent state and federal rules and regulations.

Regional Water Quality Control Board

The RWQCB issues permits for activities that could cause impacts to surface waters and groundwater in the vicinity of any project site, including construction activities. The NPDES stormwater permitting program, under Section 402(p) of the federal Clean Water Act, is administered by the RWQCB on behalf of the EPA. The proposed project site falls under the jurisdiction of the CRBRWQCB, Region 7. Permits issued to control pollution (i.e., waste discharge requirements and NPDES permits) must implement SWRQB Basin Plan requirements (i.e., water quality standards), taking into consideration beneficial uses to be protected.

The State Water Board has adopted significant changes to Order 99-08-DWQ. The recently adopted General Permit (Order 2009-0009-DWQ) differs from Order 99-08-DWQ in the following significant ways:

- **Rainfall Erosivity Waiver:** The recently adopted General Permit includes the option allowing a small construction site (>1 and <5 acres) to self-certify if the rainfall erosivity value (R value) for their site's given location and time frame compute to be less than or equal to 5.
- **Technology-Based Numeric Action Levels:** The recently adopted General Permit includes numeric action levels for pH and turbidity.
- **Technology-Based Numeric Effluent Limitations:** The recently adopted General Permit contains daily average numeric effluent limitations (NELs) for pH during any construction phase where there is a high risk of pH discharge and daily average NELs turbidity for all discharges in Risk Level 3. The daily average NEL for turbidity is set at 500 nephelometric turbidity units (NTU) to represent the minimum technology that sites need to employ (to meet the traditional Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology standard) and the traditional, numeric receiving water limitations for turbidity.
- **Risk-Based Permitting Approach:** The recently adopted General Permit establishes three levels of risk possible for a construction site. Risk is calculated in two parts: project sediment risk and receiving water risk.
- **Minimum Requirements Specified:** The recently adopted General Permit imposes more minimum best management practices (BMPs) and requirements that were previously

4.8 HYDROLOGY AND WATER QUALITY

only required as elements of the stormwater pollution prevention plan (SWPPP) or were suggested by guidance.

- **Project Site Soil Characteristics Monitoring and Reporting:** The recently adopted General Permit provides the option for dischargers to monitor and report the soil characteristics at their project location. The primary purpose of this requirement is to provide better risk determination and eventually better program evaluation.
- **Effluent Monitoring and Reporting:** The recently adopted General Permit requires effluent monitoring and reporting for pH and turbidity in stormwater discharges. The purpose of this monitoring is to determine compliance with the NELs and evaluate whether numeric action levels included in this General Permit are exceeded.
- **Receiving Water Monitoring and Reporting:** The recently adopted General Permit requires some Risk Level 3 dischargers to monitor receiving waters and conduct bio-assessments.
- **Post-Construction Storm Water Performance Standards:** The recently adopted General Permit specifies runoff reduction requirements for all sites not covered by a Phase I or Phase II MS4 NPDES permit, to avoid, minimize, and/or mitigate post-construction stormwater runoff impacts.
- **Rain Event Action Plan:** The recently adopted General Permit requires certain sites to develop and implement a Rain Event Action Plan that must be designed to protect all exposed portions of the site within 48 hours prior to any likely precipitation event.
- **Annual Reporting:** The recently adopted General Permit requires all projects that are enrolled for more than one continuous three-month period to submit information and annually certify that their site is in compliance Fact Sheet 2009-0009-DWQ-6, September 2, 2009, with these requirements. The primary purpose of this requirement is to provide information needed for overall program evaluation and public information.
- **Certification/Training Requirements for Key Project Personnel:** The recently adopted General Permit requires that key personnel (e.g., SWPPP preparers, inspectors, etc.) have specific training or certifications to ensure their level of knowledge and skills are adequate to ensure their ability to design and evaluate project specifications that will comply with General Permit requirements.
- **Linear Underground/Overhead Projects:** The recently adopted General Permit includes requirements for all linear underground/overhead projects.

LOCAL

Imperial County

General Plan

Due to the economical, biological, and agricultural significance water plays in Imperial County, the General Plan contains policies and programs created to ensure water resources are preserved and protected. **Table 4.8-1** identifies General Plan policies and programs for water quality and flood hazards that are relevant to the proposed project and summarizes the project's consistency with the General Plan. While this Draft EIR analyzes the proposed project's

consistency with the General Plan pursuant to California Environmental Quality Act (CEQA) Guidelines Section 15125(d), the Imperial County Board of Supervisors will determine the project's consistency with the General Plan.

Stormwater Retention Basins

Based on Policy 4 of the Water Element in the General Plan (see **Table 4.8-1**), the County of Imperial has developed requirements for stormwater retention basins to ensure the effectiveness of the basins through proper sizing and design. Imperial County requires that the basins be designed to have a volume capacity for a 3-inch rainfall event and must empty within 72 hours for mosquito abatement. In addition, the finished floor elevations must be 1 foot higher than the 100-year frequency rainfall event. Stormwater retention basins would be assumed to collect project runoff from all on-site sources.

**TABLE 4.8-1
PROJECT CONSISTENCY WITH GENERAL PLAN HYDROLOGY AND WATER QUALITY POLICIES**

General Plan Policies	Consistency with General Plan	Analysis
Water Element		
<p>Policy 4 – Protection of Water Resources from Hazardous Materials</p> <p>Program: The County of Imperial shall make every reasonable effort to limit or preclude the contamination or degradation of all groundwater and surface water resources in the County.</p> <p>Program: All development proposals brought before the County of Imperial shall be reviewed for potential adverse effects on water quality and quantity, and shall be required to implement appropriate mitigation measures for any significant impacts.</p>	Yes, with mitigation	Potential significant adverse impacts to water quality will be addressed through compliance with the NPDES stormwater pollution prevention program (SWPPP) and the required best management practices. The analysis and effects to supply have been addressed by the Water Supply Assessment required by Senate Bill (SB) 610 and in the Written Verification of Water Supply required by SB 221. The SB 610 Water Supply Assessment determined that as long as the appropriate infrastructure is in place, the amount of water available and the stability of the water supply chain ensure that the proposed project's water needs will be met for the next 20 years.
<p>Goal 2: Long-term viability of the Salton Sea, Colorado River, and other surface waters in the County will be protected for sustaining wildlife and a broad range of ecological communities.</p>	Yes	The project is subject to the federal and state water quality regulations of the Colorado River Basin RWQCB. A stormwater pollution prevention plan (SWPPP) will be required as part of the project.
<p>Goal 4: The County will adopt and implement ordinances, policies, and guidelines that assure the safety of County ground and surface waters from toxic or hazardous materials and wastes.</p>	Yes	Potential significant adverse impacts to water quality will be addressed through the NPDES stormwater pollution prevention program (SWPPP) and the required best management practices. The project will be required to prevent contamination of surface waters from toxic or hazardous materials and wastes.
Conservation and Open Space Element		
<p>Goal 8: The County will conserve, protect, and enhance the water resources in the planning area.</p> <p>Objective 8.4: Ensure the use and protection of</p>	Yes	The project is subject to the federal and state water quality regulations of the Colorado River Basin RWQCB. A stormwater pollution prevention plan (SWPPP) will be required. The

4.8 HYDROLOGY AND WATER QUALITY

General Plan Policies	Consistency with General Plan	Analysis
<p>the rivers and other waterways in the County. Ensure proper drainage and provide accommodation for storm runoff from urban and other developed areas in manners compatible with requirements to provide necessary agricultural drainage.</p> <p>Objective 8.5: Protect and improve water quality and quantity for all water bodies in Imperial County.</p> <p>Objective 8.6: Eliminate potential surface and groundwater pollution through regulations as well as educational programs.</p>		<p>SWPPP will include best management practice (BMP) recommendations incorporated into final project design to ensure that potential water quality impacts have been addressed.</p> <p>Potential significant adverse impacts to water quality will be addressed through the NPDES stormwater pollution prevention program and the required best management practices.</p>
Land Use Element		
<p>Goal 9: Identify and preserve significant natural, cultural, and community character resources and the County's air and water quality.</p> <p>Objective 9.1: Preserve as open space those lands containing watersheds, aquifer recharge areas, floodplains, important natural resources, sensitive vegetation, wildlife habitats, historic and prehistoric sites, or lands which are subject to seismic hazards and establish compatible minimum lot sizes.</p> <p>Objective 9.2: Reduce risk and damage from flood hazards by appropriate regulations.</p>	Yes	<p>No aquifer recharge areas, floodplains, important natural resources, sensitive habitat, or historic or prehistoric sites existed on-site at the time the Conditional Use Permit (CUP) application was submitted. Mitigation implemented by the project for significant impacts to burrowing owl would reduce impacts to less than significant. Additionally, the proposed project would be required to comply with the provisions of the California Building Code (CBC) and Uniform Building Code (UBC) as well as other applicable local and state building codes, and other applicable local and state seismic building standards and regulations.</p>

4.8.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following State CEQA Guidelines, as listed in Appendix G. The project would result in a significant impact to hydrology and water quality if it would result in any of the following:

- 1) Violate any water quality standards or waste discharge requirements.
- 2) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- 3) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.

- 4) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.
- 5) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
- 6) Otherwise substantially degrade water quality.
- 7) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- 8) Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- 9) Expose people or structures to a significant loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- 10) Inundation by seiche, tsunami, or mudflow.

The proposed project is located outside of the 100-year floodplain (FEMA 2009) and therefore will not result in the placement of housing or structures in a location subject to 100-year flooding hazards. Additionally, there are no levees or dams in the vicinity of the project site. Therefore, these impacts are not addressed in this Draft EIR.

METHODOLOGY

The following hydrology and water quality analysis is based on a review of published information and reports regarding regional hydrology, climate, and geology including a letter report prepared for the proposed East Brawley Geothermal Development project (DDE 2009) (**Appendix F**), the Geotechnical Investigation, East Brawley Geothermal Plant (Black Eagle Consulting 2008), and the East Brawley Conditional Use Permit Application (Ormat 2010).

The proposed project would connect to the Imperial Irrigation District (IID) and the City of Brawley for water services. Water supply impacts are addressed in Section 4.13, Utilities, of this DEIR.

PROJECT IMPACTS AND MITIGATION MEASURES

Construction-Phase Water Quality Impacts

Impact 4.8.1 Buildout of the proposed East Brawley Geothermal Development project area could result in soil disturbance associated with construction activities and other aspects of construction, resulting in accelerated erosion and sedimentation or the release of other pollutants to local waterways. This impact is considered **potentially significant**.

Construction activities would consist of grading and vegetation removal activities, which would increase soil erosion rates on the project site in the absence of control measures (except for the proposed improvements to the BWWTP, which would not involve any ground-disturbing activities). Although the project site is relatively flat, stormwater runoff could result in short-term

4.8 HYDROLOGY AND WATER QUALITY

sheet erosion in areas of exposed, raw soil. In addition, the compaction of soils by heavy equipment could reduce the infiltration capacity of the soils, thereby increasing the runoff and erosion potential. If uncontrolled, the soil materials could result in engineering problems, blockage of drainage channels, and downstream sedimentation. In addition, refueling and the parking of construction equipment and other vehicles on-site during construction may result in spills of oil, grease, or related pollutants that may discharge into area drainage channels. Improper handling, storage, or disposal of fuels and materials or improper cleaning of machinery could cause water quality degradation.

It is not anticipated that groundwater resources would be impacted during construction activities because of the short duration of construction and the potential pollutants that will be located on-site during construction, which are not of the type or quantity to pose a significant risk to groundwater.

The proposed project would be in excess of 1 acre and is therefore subject to comply with the SWRCB's NPDES General Permit for Storm Water Discharges Associated with Construction Activity (CA-S000002) requirements. The purpose of the permit is to protect water quality from development areas that would discharge into a surface water body. The proposed project would comply with the SWRCB's permit by preparing and implementing a stormwater pollution prevention plan (SWPPP) identifying the project's plan for water quality protection during construction. These control measures, or best management practices (BMPs), must meet the technical standards established by the permit related to conventional (e.g., sediment) and non-conventional (e.g., toxics) pollutants and must be designed and implemented to ensure the proposed project does not contribute runoff to local water bodies that would cause or contribute to violation of water quality standards. The California Stormwater Quality Association has published a set of BMPs for both pre- and post-construction periods, as contained in the series *California Storm Water Best Management Practices Handbooks*, which the proposed project must utilize in drafting the SWPPP. The proposed project would utilize BMPs during construction activities as specified in the SWPPP and applicable NPDES permits.

Because buildout of the proposed East Brawley Geothermal Development project area could result in soil disturbance, this impact is considered **potentially significant**.

Mitigation Measures

MM 4.8.1 The project applicant shall prepare a stormwater pollution and prevention plan (SWPPP) to be administered during grading and project construction. The SWPPP must incorporate best management practices (BMPs) meeting technical standards of the General Construction permit to ensure that potential water quality impacts (including on- and off-site erosion) during construction phases are minimized and that a violation of water quality standards does not occur. The SWPPP must address spill prevention and include a countermeasure plan describing measures to ensure proper collection and disposal of all pollutants handled or produced on the site during construction, including sanitary wastes, cement, and petroleum products. BMPs included in the SWPPP must be consistent with the California Stormwater Best Management Practices Handbook for Construction. The SWPPP must be submitted to the Colorado River Basin Regional Water Quality Control Board, Region 7, and to the County for review prior to the issuance of grading permits.

Timing/Implementation: Prior to issuance of grading permits

Enforcement/Monitoring: Project applicant; CRBRWQCB

Mitigation measure **MM 4.8.1** requires preparation and implementation of a SWPPP, which would reduce potential construction-phase water quality effects within the East Brawley Geothermal Development project area to a minimum. The BMPs that are provided in the SWPPP shall be shown to be effective as required under the adopted changes to Order 99-08-DWQ for new general construction stormwater permit provisions. This impact is considered **less than significant**.

Substantially Degrade Water Quality: Operational Water Quality Impacts

Impact 4.8.2 Buildout of the proposed East Brawley Geothermal Development project area would introduce impervious surfaces and structures to the project site, resulting in increased runoff and additional pollutants. This impact is considered **potentially significant**.

Development of the proposed project would result in a substantial alteration in the existing site conditions and the introduction of urban pollutant sources. Urban runoff typically consists of oils, grease, fuel, antifreeze, byproducts of combustion (such as lead, cadmium, nickel, and other metals), and landscaping-related products (pesticides, herbicides, and fertilizers containing nutrients). Precipitation during the early portion of the traditional wet season (November to April) displaces these pollutants into the stormwater runoff, resulting in high pollutant concentrations in the initial wet weather runoff. This initial runoff with peak pollutant levels can be referred to as the “first flush” of storm events. It is estimated that during the rainy season, the first flush of heavy metals and hydrocarbons occurs during the first 5 inches of seasonal rainfall.

The amount and type of runoff generated by the project would be greater than that under existing conditions due to increases in impervious surfaces. Without any water quality controls, there would be a corresponding increase in urban runoff pollutants and first flush roadway contaminants such as heavy metals, oil, and grease, as well as an increase in nutrients (i.e., fertilizers) and other chemicals from landscaped areas. Increases in these constituents could result in water quality impacts to receiving water bodies. These pollutants have the potential to degrade water quality and could result in significant impacts.

Imperial County is subject to the requirements of a NPDES Municipal Stormwater Permit issued by the SWRCB—the “Small MS4 Permit” (NPDES General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (CA-S000004)). This permit requires that discharges of pollutants from areas of new development be reduced to the maximum extent feasible in order to protect receiving waters and uphold water quality standards. Compliance with this standard requires that water quality control measures be incorporated into the design of new development to reduce pollution discharges in site runoff over the life of the project.

The RWQCB is responsible for administering NPDES permit requirements, such as the use of operational best management practices, to ensure that projects are in compliance with water quality standards as set forth in the Clean Water Act. In compliance with the County’s requirements per the Small MS4 Permit, the project applicant would be required to develop and implement a post-construction stormwater management plan (industrial SWPPP) and would be required to implement BMPs described in the industrial SWPPP. Such BMPs would be required to be consistent with the *California Stormwater Best Management Practices Handbook for Industrial and Commercial Facilities* to ensure that water quality is protected during ongoing operations of the project. The BMPs must be designed, constructed, and maintained to meet a performance standard established by Imperial County and the Colorado River Basin RWQCB, Region 7.

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The project proposes a stormwater retention basin, considered part of the project design features, as post-construction BMPs. The power plant site will drain to a stormwater retention basin. After a rain event, the water will either be pumped to injection or discharged after sampling within three days as required by Imperial County Public Health Department design criteria to prevent mosquito harborage and breeding. The wells pads will utilize mud sumps/containment basins to capture water and contain waste.

Because buildout of the proposed East Brawley Geothermal Development project area would introduce impervious surfaces and structures to the project site, this impact is considered **potentially significant**.

Mitigation Measures

MM 4.8.2 Stormwater drainage from on-site impervious surfaces (including roads) shall be collected and routed through specifically designed water quality treatment facilities for removal of pollutants of concern (e.g., sediment, oil/grease), as approved by the Imperial County Department of Planning and Development Services. As part of the Improvement Plans, the project applicant shall verify that the proposed stormwater retention basin and sumps/containment basins are appropriate to treat the pollutants of concern from this project.

Timing/Implementation: Prior to issuance of grading permits

Enforcement/Monitoring: Project applicant; Imperial County Department of Planning and Development Services

Mitigation measure **MM 4.8.1** requires preparation and implementation of a SWPPP, which would reduce potential construction-phase water quality effects within the East Brawley Geothermal Development project area. The BMPs that are provided in the SWPPP shall be shown to be effective as required under the adopted changes to Order 99-08-DWQ for new general construction stormwater permit provisions. This impact is considered **less than significant**.

Alteration of Drainage Patterns/Increased Stormwater Volume Impacts

Impact 4.8.3 Buildout of the proposed East Brawley Geothermal Development project area would result in an increase in impervious surface area that could result in alteration of existing on-site drainage patterns and contributions to substantial runoff exceeding existing stormwater capacity. This impact is considered **potentially significant**.

The proposed development would alter the drainage characteristics of the site by creating new impervious surfaces. The project could result in an increase in the rate or amount of surface runoff, with the potential for related impacts such as on-site or downstream flooding.

The power plant site will drain to a stormwater retention basin. The general urban runoff would be piped through the storm drain system, into retention facilities, and then into existing IID drains, which will be placed underground as required by the Imperial Irrigation District. The retention basin will be sized to retain 100 percent of runoff produced in the project area during a 100-year/24-hour storm (assumed to be a total of 3 inches of rain). The retention basin would be required to drain all discharge into the IID drainage system within 72 hours of any given storm event. All storm drain systems would be designed to the standards of the County of Imperial and

the CRBRWQCB. Therefore, impacts related to alteration of drainage patterns and increased stormwater volumes would be less than significant.

According to the Conditional Use Permit application, only nontoxic, nonhazardous drilling mud would be utilized during drilling operations. Waste drilling mud and drill cuttings would be stored in aboveground storage tanks or lined containment basins. Any runoff from the well sites would be discharged into containment basins. The well site containment basins would be constructed and maintained such that permeability would not exceed 1×10^{-6} centimeters per second. Wells would be cased and cemented to prevent interzonal migrations of fluids and reduce the possibility of blowouts.

The Petroleum Engineer for the Division of Oil, Gas, and Geothermal Resources of the California Geologic Survey will review all drilling programs and approve the drilling of all production and injection wells as well as provide on-site inspections during drilling operations. High subsurface pressure can be encountered in some geothermal reservoirs, increasing the potential for a well blowout to occur. However, no highly pressured zones are expected to be encountered in the East Brawley reservoir.

Because the proposed project will implement mitigation measures to reduce impacts from increased impervious surfaces resulting in alteration of existing on-site drainage patterns and contributions to substantial runoff exceeding existing stormwater capacity, this impact is **less than significant with mitigation**.

Mitigation Measures

No additional mitigation is required. Mitigation measures **MM 4.8.1** and **MM 4.8.2** described above would reduce the potential drainage pattern effects within the East Brawley Geothermal Development project area to a minimum. This impact is considered **less than significant**.

Interference with Groundwater Recharge

Impact 4.8.4 Conversion of the project site from agricultural to commercial uses may cause groundwater levels to fluctuate and could affect recharge. This impact is considered **less than significant**.

An approximately 8- to 9-foot-thick silt layer was encountered starting at approximately 15 to 17 feet below surface (Black Eagle 2008, p. 8). Groundwater depth coincided with the upper surface of the silty sand layer at 15 to 17 feet below surface (Black Eagle 2008, p. 8). The CPT pore pressure dissipation test indicated groundwater is at 10.6 feet depth (Black Eagle 2008, p. 8). Depth of groundwater may fluctuate due to localized geologic conditions, precipitation, irrigation, drainage, and construction practices in the region. Because the site is currently used for agricultural purposes, the depth of groundwater elevation may fluctuate according to crop irrigation cycles. Although the well pads will not be completely impervious, a conservative approach was used to assume the project will convert approximately 188.75 acres of active agricultural lands to impervious surfaces. The increase in impervious surfaces from the proposed project would affect water infiltration and groundwater levels. However, the project includes retention basins that would be used to retain stormwater during rain events. Therefore, project impacts with regard to groundwater interference are considered **less than significant**.

Additionally, the project site would not utilize groundwater as its water supply for the required 5,500 acre-feet of water needed for the proposed project's cooling towers. Instead, it would be served by tertiary treated water from the City of Brawley Wastewater Treatment Plant (BWWTP)

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and the IID. Approximately 4,400 acre-feet would be supplied by expansion of the BWWTP to include a tertiary system, and the remaining 1,100 acre-feet would be supplied by the Imperial Irrigation District.

Mitigation Measures

None required.

4.8.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative hydrology and water quality setting for the project is the Imperial Valley Planning Area of the East Colorado Basin Plan. Buildout of the project site and surrounding area, which includes the projects listed in **Table 4.0-1** in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this Draft EIR, would result in the construction of additional impervious surfaces that would change drainage patterns, reduce water absorption, and increase surface runoff. This development would also increase water demand from IID. The estimated water demand of each of these projects is listed in **Table 4.8-2** below. As shown in this table, the total water demand of these projects is estimated at 13,788.5 acre-feet per year.

**TABLE 4.8-2
CUMULATIVE PROJECTS WATER DEMAND**

Number	Project	Total Water Demand (acre-feet/year)
1	Hudson Ranch II LLC (Burrtec)	850
2	Salton Sea Solar Farm 11	40
3	Chocolate Mountain Solar Farm	80
4	Frink Road Solar Power	0.5
5	Black Rock Unit #1, 2, 3	609
6	Energy Source Solar 1, LLC	3
7	IV Solar	33
8	Salton Sea Solar Farm 1	20
9	Superstition Solar 1	250
10	Keystone Solar Power	3
11	Ormat 21, Wister Project	5,500
12	Ram Power	900
13	Casey Water Well	0
Proposed Project		5,500
TOTAL		13,788.5

The regional waters from the Brawley hydrologic area (Imperial Valley Planning Area of East Colorado Basin) drain into the Salton Sea. Additionally, water diverted from the Colorado River that does not return to the Colorado River drains into the Salton Sea.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Hydrology and Water Quality

Impact 4.8.5 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would contribute to the cumulative effects of degradation of water quality, changes to runoff patterns, and the potential for increased flooding. This impact is considered **potentially cumulatively considerable**.

As described above, surface waters in the Imperial Valley ultimately drain into the Salton Sea via the New and Alamo rivers as well as via irrigation drains and canals. Until recently, the amount of water entering the Salton Sea was roughly balanced by the amount of water evaporating from its surface. However, due to increased demand for water supplies in the region and recent IID water transfer agreements (see Section 4.13); increasing amounts of water are being consumed in Imperial Valley as well as transferred out of the valley to population centers such as San Diego County, thus reducing inflows to the Salton Sea. Implementation of the proposed project and the projects listed in **Table 4.0-1** would contribute to this cumulative diversion of water from the Salton Sea. This would occur both through the consumption of IID water supplies and through the conversion of irrigated agricultural land that previously drained to the sea.

Agricultural runoff contributes significantly to total inflows to the Salton Sea. As irrigated agricultural land is converted to nonagricultural use, the associated runoff ceases to drain into the New and Alamo rivers, ultimately reducing the sea's total inflows. As described in Section 4.2, Agricultural Resources, the proposed project will convert approximately 188.75 acres of active farmland. According to Department of Water Resources data (1997), the projects listed in **Table 4.0-1** contain a total of approximately 1,591 acres of irrigated agricultural land. Based on the assumption that an average acre of agricultural land uses 5.25 acre-feet per year¹ and assuming a worst-case scenario in which implementation of these projects results in the conversion of the entire 1,780 acres (1,591 + 188.75 = 1,780), the proposed project in combination with other planned projects in the cumulative area would divert approximately 9,344 acre-feet per year from the Salton Sea.

Currently, about 1.3 million acre-feet flow into the Salton Sea each year and 80 percent of this total comes from Imperial Valley. As shown in **Table 4.8-2**, these projects would have a total water demand of 13,788.5 acre-feet per year. In addition, as described above, these projects could divert an additional 9,344 acre-feet per year through the conversion of irrigated agricultural land. Therefore, the proposed project in combination with other planned projects in the cumulative area could divert up to 23,132.5 acre-feet per year (13,788.5 + 9,344 = 23,132.5) from the Salton Sea. This amount represents 3 percent of the sea's current total inflows. Furthermore, given a total surface area of 376 square miles and a total volume of 7.5 million acre-feet, the diversion of 23,132.5 acre-feet per year is estimated to reduce the surface elevation of the Salton Sea by 1.2 inches. In comparison, the Salton Sea surface elevation fluctuates annually by approximately 12 inches, reaching its maximum annual elevation between March and June and its minimum elevation between October and November as a result of irrigation practices. Given this seasonal fluctuation, a drop in surface elevation of 1.2 inches is considered to be negligible and would not result in significant impacts on habitat areas.

¹ 2009 apportionment for water users that have eligible farmable cropland.

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Implementation of the proposed project in combination with the projects listed above would result in a negligible contribution to the decline in the Salton Sea's surface elevation and volume and, accordingly, a negligible effect on its salinity level. Therefore, the proposed project's contribution to this cumulative impact is considered to be **less than cumulatively considerable with mitigation**.

Furthermore, implementation of the proposed project would contribute to the cumulative effects of degradation of water quality, changes to runoff patterns, and the potential for increased flooding. However, the project's contribution would be minimized through project design, including retention basins and required mitigation measures. Additionally, the project would comply with the applicable NPDES permits. NPDES permits were created to address regional, cumulative water quality impacts from all existing and proposed development to the maximum extent feasible.

Mitigation Measures

No additional mitigation is required. Mitigation measures **MM 4.8.1** and **MM 4.8.2** described above, in addition to the proposed project's drainage features, would ensure that the project's contribution to cumulative water quality impacts would remain **less than cumulatively considerable**.

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4.9 LAND USE AND PLANNING

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) describes the existing land uses of the proposed East Brawley Geothermal Development project, characterizes surrounding uses, summarizes current planning activities in the project area, and discusses the project in the context of the Imperial County General Plan (1998a) and Land Use Ordinance (1998b). The analysis focuses on land use compatibility, General Plan, and Land Use Ordinance consistency and impacts associated with the implementation and operation of the proposed project.

4.9.1 EXISTING SETTING

PROJECT LOCATION AND SETTING

As described in Section 3.0, Project Description, the project site is located in the unincorporated area of Imperial County, north of the City of Brawley (see **Figure 3.0-1**). The project site is located east of State Route (SR) 111 and north of SR 78. The Del Rio Country Club is located south of the project site. The eastern boundary of the project site is Dietrich Road and Rutherford Road is to the north. A majority of the project site is located along Best Road from Shank to Rutherford roads. An at-grade intersection has been built at the SR 111 bypass and Best Road, which would provide access to the project. Well pads may be accessed from other County roads in the vicinity, such as Dietrich Road, Groshen Road, Rutherford Road, Ward Road, and Wills Road. The project site is located within the Westmorland and Wiest quadrangles. The plant site is located within the Westmorland Quadrangle. Development of the project, including the Brawley Wastewater Treatment Plant (BWWTP) pipeline extension, would occur in Sections 10, 11, 14, 15, 16, 21, 22, and 23, of Township 13 South, Range 14 East, San Bernardino Base and Meridian (see **Figure 3.0-2**).

The geothermal plant site is owned by Ormat Nevada Inc., aka ORNI19, LLC, and consists of one parcel of 33.7 acres. There are 39 leased parcels encompassing approximately 3,033.2 acres that will contain proposed wells and pipelines (see **Table 4.9-1**). The total area of disturbance for the project site is approximately 188.75 acres, which includes both the plant site and the wells and pipelines.

**TABLE 4.9-1
PROJECT SITE ASSESSOR'S PARCEL NUMBERS, EXISTING
ZONING, EXISTING LAND USE DESIGNATIONS, AND ACREAGE**

Item	APN	Land Use Ordinance	General Plan	Acres
Geothermal Plant Site				
1	037-140-006	A-2-G	Agriculture	33.7
Wells and Pipelines				
2	037-090-006	A-2-G	Agriculture	10.4
		A-3-G		17.2
3	037-100-001	A-3-G	Agriculture	50.9
		M-2-G		19.2
4	037-100-003	A-3-G	Agriculture	41.6

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Item	APN	Land Use Ordinance	General Plan	Acres
5	037-100-004	A-3-G	Agriculture	6.1
		M-1-G		3.9
		M-2-G		2.4
6	037-100-005	A-3-G	Agriculture	13.1
		M-1-G		14.4
7	037-100-006	A-2-G	Agriculture	41.8
		A-3-G		38.5
8	037-100-007	A-3-G	Agriculture	79.8
9	037-100-009	A-2-G	Agriculture	51.97
10	037-110-004	A-2-G	Agriculture	45.9
		A-3-G		46.0
11	037-110-005	A-2-G	Agriculture	3.0
12	037-110-007	A-3-G	Agriculture	79.6
13	037-110-009	A-2-G	Agriculture	20.7
		A-3-G		31.3
14	037-110-015	A-2-G	Agriculture	15.5
15	037-110-016	A-2-G	Agriculture	59.5
16	037-120-030	A-2-R-G	Agriculture	79.2
17	037-120-031	A-2-R-G	Agriculture	79.2
18	037-140-002	A-2-G	Agriculture	328.2
19	037-140-005	A-2-G	Agriculture	93.5
20	037-140-009	A-2-G	Agriculture	79.9
21	037-140-011	City of Brawley	Agriculture	9.6
22	037-140-013	A-2-G	Agriculture	77.7
23	037-140-014	A-2-G	Agriculture	80.0
24	037-140-015	A-2-G	Agriculture	80.0
25	037-140-017	City of Brawley	Agriculture	29.2
26	037-140-019	A-2-G	Agriculture	99.9
29	037-150-015	A-2-R-G	Agriculture	159.7
30	037-150-018	A-2-R-G	Agriculture	4.7
31	037-150-019	A-2-R-G	Agriculture	312.6
32	037-160-015	A-2-G	Agriculture	239.3
33	037-160-016	A-2-G-U	Agriculture	39.9
34	037-160-017	A-2-G-U	Agriculture	39.6

Item	APN	Land Use Ordinance	General Plan	Acres
35	037-160-019	A-2-G-U	Agriculture	77.6
36	037-160-021	A-2-G-U	Urban	49.4
37	037-160-027	A-2-G-U	Urban	6.6
		M-2-G-U		0.9
		S-1-G-U		123.3
38	037-160-069	City of Brawley	Urban	9.9
		M-2-G-U		1.1
39	037-180-009	A-3-G	Agriculture	80.2
40	037-180-011	A-3-G	Agriculture	159.2

ADJACENT LAND USES

The plant site is surrounded by agricultural lands (both active and fallow). The proposed well locations for the plant are also located on agricultural lands. Due west of the project is the Brawley Wastewater Treatment Plant. South of the project site is actively cultivated farmland. The New River runs west of the project site, beyond the agricultural land. The Del Rio Country Club and the City of Brawley are southwest of the project area. Best Road runs north-south along the eastern side of the plant site. The plant site is bordered to the north by Field Road, on the east by the concrete-lined Best Lateral, on the south by an Imperial Irrigation District drain, and on the west by a dirt road that parallels the southwest- to northeast-trending tracks of the Union Pacific Railroad (see Figure 3.0-2).

4.9.2 REGULATORY FRAMEWORK

STATE

California Division of Oil, Gas, and Geothermal Resources

California state law designates the California Division of Oil, Gas and Geothermal Resources (CDOGGR) as the lead agency for geothermal exploration projects on land under the jurisdiction of the State or County. The division oversees the drilling, operation, maintenance, and plugging and abandonment of oil, natural gas, and geothermal wells (CDOGGR 2010). The regulatory program emphasizes the wise development of oil, natural gas, and geothermal resources in the state through sound engineering practices that protect the environment, prevent pollution, and ensure public safety (CDOGGR 2010). The CDOGGR has designated the Imperial County Planning and Development Services Department as the lead agency for geothermal exploration projects under County jurisdiction.

LOCAL

Imperial County Land Use Ordinance, Title 9

The Imperial County Board of Supervisors adopted the Land Use Ordinance on November 24, 1998 (County of Imperial 2010). The purpose of Title 9, the Land Use Ordinance for the County of Imperial, is to provide comprehensive land use regulations for all unincorporated areas of

4.9 LAND USE AND PLANNING

Imperial County, including the establishment of zoning areas. These regulations are adopted to promote and protect the public health, safety, and general welfare through the orderly regulation of land uses throughout the unincorporated areas of the county. The geothermal plant site is currently zoned A-2-G and is primarily defined as suitable for agricultural uses (limited) and agricultural related compatible uses. Permitted uses in the A-2-G zone include oil, gas, and geothermal exploration. The remaining parcels within the project site are designated as shown in **Table 4.9-1** above and shown in **Figure 3.0-4**.

Division 17 Geothermal

The purpose of these regulations is to facilitate the beneficial use of the geothermal resource for the general welfare of the people of Imperial County and the State of California, to protect the resource from wasteful or detrimental uses, and to protect people, property, and the environment from detriments that might result from the improper use of the resource. It is the intent of these regulations to integrate, to the extent possible, Imperial County's regulations with those of other governmental agencies that regulate geothermal resource exploration and development.

The regulations ensure that no gap in the protection of the public health, safety, and general welfare occurs as the result of changes in the regulations or enforcement policies of the other agencies.

Imperial County General Plan

The General Plan serves as the overall guiding policy for Imperial County. Relevant Imperial County General Plan policies related to land use are provided below. **Table 4.9-2** discusses the project's consistency with the County's General Plan policies. While this DEIR analyzes the proposed East Brawley Geothermal Development project's consistency with the General Plan pursuant to California Environmental Quality Act (CEQA) Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

**TABLE 4.9-2
PROJECT CONSISTENCY WITH APPLICABLE GENERAL PLAN LAND USE POLICIES**

General Plan Policies	Consistency with General Plan	Analysis
<p>Air Quality Policy: The County of Imperial air basin has been classified by the U.S. Environmental Protection Agency (U.S. EPA) as an area of "moderate" to "serious" nonattainment for PM10 and other air emissions. According to the National Clean Air Act (CAA), "serious" nonattainment areas are required to implement the more stringent Best Available Control Measures (BACM) requirements while moderate non-attainment areas are required to implement the less stringent Reasonable Available Control Measures (RACM). Therefore new and existing developments will need to meet all pertinent Local, State, and Federal Air pollution emissions standards and be subject to an air permit by the Local Air Pollution Control District.</p> <p>Program: Prior to approval of development the</p>	<p>Yes, with Mitigation</p>	<p>Direct, indirect, and cumulative impacts resulting from the proposed project have been identified and mitigated where feasible. For further discussion, refer to Section 4.3, Air Quality, of this DEIR.</p>

General Plan Policies	Consistency with General Plan	Analysis
project proponent shall comply with the Local Air Pollution Control District current air quality attainment regulations in effect at the time of development.		
Geothermal Policy: The County of Imperial supports and encourages the full, orderly, and efficient development of geothermal/alternative energy resources while at the same time preserving and enhancing where possible agricultural, biological, human, and recreational resources.	Yes	Direct, indirect, and cumulative impacts resulting from the proposed project have been identified and mitigated where feasible. For further discussion, refer to Section 4.2, Agricultural Resources, and Section 4.4, Biological and Natural Resources, of this DEIR.

4.9.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following State CEQA Guidelines Appendix G. An impact is considered significant if the project would:

- 1) Physically divide an established community.
- 2) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.
- 3) Conflict with any applicable habitat conservation or natural community conservation plan.

Based upon the General Plan and Land Use Ordinance, it has been determined that the project would not physically divide an established community. The proposed project would place a geothermal power plant and associated wells and pipelines in an area of unincorporated Imperial County with predominantly agricultural land uses. Therefore, this issue will not be discussed further in the EIR.

The project will require a Conditional Use Permit to allow the construction and operation of both the geothermal facilities and the wells on the proposed project site as required under the Land Use Ordinance (Conditional Use Permit 07-0029 for power plant operations and well field).

The County of Imperial does not have an adopted habitat conservation plan or natural community conservation plan that is applicable to the project site. The proposed project would be consistent with the applicable land use policies of the Geothermal Transmission Element of the General Plan. The Notice of Preparation for the proposed project determined no impact would occur regarding conflict with an adopted habitat conservation plan or natural community conservation plan. Therefore, this impact will not be addressed in this DEIR.

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Methodology

Evaluation of potential land use impacts of the proposed East Brawley Geothermal Development project was based on review of relevant planning documents, including the Imperial County General Plan, the Geothermal Transmission Element of the General Plan, the Imperial County Land Use Ordinance, and field review of the project site and surrounding area. The focus of the land use analysis is on land use impacts that would result from implementation of the proposed project. Land use conflicts are identified and evaluated based on existing land uses, land uses proposed as part of the project, land use designations, and standards and policies related to land use. Land use compatibility is based on the intensity and patterns of land use to determine whether the project would result in incompatible uses or nuisance impacts to sensitive receptors (such as residences, medical facilities, and schools).

Potential land use conflicts or incompatibility (specifically during construction activities) are usually the result of other environmental effects, such as noise generation or air quality issues resulting from grading activities. Operational land use impacts of the project are evaluated in this section, and the reader is referred to Sections 4.1 through 4.8 and 4.10 through 4.14 for detailed analysis of other environmental impacts, including noise, traffic, air quality, and biological and natural resources, that would result from the proposed project's construction and operation.

PROJECT IMPACTS AND MITIGATION MEASURES

Consistency with General Plan, Community Area Plan, and Land Use Ordinance

Impact 4.9.1 The proposed East Brawley Geothermal Development project is consistent with the County of Imperial General Plan and Land Use Ordinance. The proposed project is also required to be consistent with General Plan and Land Use Ordinance standards. This impact is considered **less than significant**.

The Imperial County General Plan currently designates a majority of the site as Agriculture (County of Imperial 1998). A portion of the southwest portion of the larger project area where pipelines are depicted is located in an area designated as Urban (refer to **Figure 3.0-4**). The project's proposed land uses are consistent with these designations. Upon approval, the proposed project would be consistent with land use designations that allow for geothermal development. The Geothermal Transmission Element and Land Use Ordinance contain specific standards with which development must comply.

In addition, the proposed project would be considered consistent with General Plan strategies and concepts related to providing a geothermal project within the project area. Additional discussion of the project's consistency with specific General Plan policies is located by subject area in Sections 4.1 through 4.14 of this DEIR document.

This impact would be considered **less than significant**.

Mitigation Measures

None required.

Incompatibility with Adjacent Land Uses

Impact 4.9.2 The proposed project would develop a geothermal power plant and associated pipelines and wells, which will temporarily increase the intensity of land use on the project site and would place industrial development in an area of unincorporated Imperial County that is predominantly agricultural. This impact is considered **potentially significant**.

The proposed East Brawley Geothermal Development project area is located in an agricultural area on private lands within the North Brawley Known Geothermal Resource Area (KGRA) and is located entirely within the North Brawley Geothermal Overlay Zone. It is anticipated that the construction of the project well pads would disturb approximately 188.75 acres of active and fallow agricultural and would remove the land from agricultural production for the 30-year life of the project. Approximately 18 miles of either single pipeline or combined production and injection pipeline route would be built. The lands occupied by the pipeline would not be available for farming over the life of the project unless the pipes can be run along existing roads or ditches. However, the disturbed lands, except for possibly the power plant site, would be returned to agricultural use once the wells are abandoned, the pipelines removed, and the well pads reclaimed. As such, the project would temporarily convert portions of the project site to nonagricultural use. In addition, several residences and agriculture-related buildings existing on the project site would be relocated prior to the startup of the power plant.

As previously discussed, the adjacent land uses primarily include actively cultivated and fallow agricultural lands. The proposed project has the potential to temporarily increase the intensity of land use on the project site and would place industrial development in an area of unincorporated Imperial County that is predominantly agricultural. The project has the potential to temporarily impact residences within the project area. Conflicts associated with environmental impacts such as air quality, traffic, noise, and hazards have been analyzed in the appropriate sections of this DEIR, and any feasible mitigation measures have been identified to reduce or avoid those impacts.

Mitigation Measures

MM 4.9.2a The project applicant shall prepare a Construction Notification Plan. Forty-five (45) days prior to construction, the project applicant shall prepare and submit the Construction Notification Plan to the County of Imperial for approval. The plan shall identify the procedures the applicant will use to inform property owners of the location and duration of construction, identify approvals that are needed prior to posting or publication of construction notices, and include text of proposed public notices and advertisements.

Timing/Implementation: Forty-five (45) days prior to construction

Enforcement/Monitoring: County of Imperial Department of Planning and Development Services

MM 4.9.2b A public notice mailer shall be prepared and mailed no less than 15 days prior to construction. The notice shall identify construction activities that would restrict, block, remove parking, or require a detour to access existing residential properties. The notice shall state the type of construction activities that will be conducted and the location and duration of construction. The applicant shall mail the notice to all residents or property owners within 1,000

4.9 LAND USE AND PLANNING

feet of the project site and to any property owners or tenants that could be impacted by construction activities. If construction delays of more than seven days occur, additional noticing shall be required to the public and to local and state agencies.

Timing/Implementation: No less than 15 days prior to construction

Enforcement/Monitoring: County of Imperial Department of Planning and Development Services

Implementation of mitigation measures **MM 4.9.2a** and **MM 4.9.2b** would reduce this impact to a **less than significant** level.

4.9.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for land use impacts is Imperial County and the nearby City of Brawley. Cumulative development includes buildout of the Imperial County General Plan as well as any existing, approved, proposed, and reasonably foreseeable development within the cumulative study area, as described in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this DEIR. The cumulative impact analysis herein focuses on the proposed project's contribution to cumulative land use impacts and whether that contribution is considered considerable.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Land Use Compatibility Impact

Impact 4.9.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in development that would change existing land uses patterns and intensity. This impact is considered **less than cumulatively considerable**.

Continued development in Imperial County would result in increased urbanization, including the density of residential, commercial, office, recreational, and public uses. Under cumulative conditions, conflicts between land uses may occur. Generally, land use conflicts would be related to noise, traffic, air quality, and hazards/human health and safety issues, which are discussed in the relevant sections of the Draft EIR. Land use conflicts are site-specific and would not result in a cumulative impact. Cumulative incompatibility issues are anticipated to be generally addressed and mitigated on a project-by-project basis. The cumulative environmental effects of development of the project site and surrounding area are addressed in the technical sections of this DEIR (Sections 4.1 through 4.14). This impact is considered **less than cumulatively considerable**.

Mitigation Measures

None required.

REFERENCES

California Division of Oil, Gas and Geothermal Resources (CDOGGR). 2010. <http://www.conservation.ca.gov/dog/Pages/Index.aspx> (accessed June 21, 2010).

County of Imperial. 1998a. *Imperial County General Plan Land Use Element*.

———. 1998b. *Imperial County Land Use Ordinance*.

———. 2010. <http://www.co.imperial.ca.us/> (accessed June 21, 2010).

4.10 NOISE

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) discusses and analyzes the ambient noise characteristics of the proposed East Brawley Geothermal Development project. All of the information provided in this section is based on the East Brawley Noise Impact Assessment prepared by Ormat Nevada Inc. (2010) (see **Appendix I**).

4.10.1 EXISTING SETTING

CONCEPTS AND TERMINOLOGY

Acoustic Fundamentals

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound, as described in more detail below, is mechanical energy transmitted in the form of a wave because of a disturbance or vibration.

Amplitude

Amplitude is the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3 dB change in amplitude as the minimum audible difference perceptible to the average person.

Frequency

Frequency is the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. Sound waves below 16 Hz or above 20,000 Hz cannot be heard at all, and the ear is more sensitive to sound in the higher portion of this range than in the lower. To approximate this sensitivity, environmental sound is usually measured in A-weighted decibels (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA.

Characteristics of Sound Propagation and Attenuation

Noise can be generated by a number of sources, including mobile sources, such as automobiles, trucks and airplanes, and stationary sources, such as construction sites, machinery, and industrial operations. Noise generated by mobile sources typically attenuates (loudness is reduced) at a rate between 3.0 to 4.5 dBA per doubling of distance. The rate depends on the ground surface and the number or type of solid objects between the noise source and the receiver that interrupt the sound wave. Mobile transportation sources, such as vehicles traveling on highways with hard and flat surfaces, such as concrete or asphalt, have an attenuation rate of 3.0 dBA per doubling of distance. Soft surfaces, such as uneven or vegetated terrain, have an attenuation rate of about 4.5 dBA per doubling of distance from the source. Noise generated by stationary sources typically attenuates at a rate of approximately 6.0 to 7.5 dBA per doubling of distance from the source.

Sound levels can be reduced by placing barriers between the noise source and the receiver. In general, barriers contribute to decreasing noise levels only when the structure breaks the "line of

4.10 NOISE

sight” between the source and the receiver. Buildings, concrete walls, and berms can all act as effective noise barriers. Wooden fences or broad areas of dense foliage can also reduce noise but are less effective than solid barriers.

Noise Descriptors

The selection of a proper noise descriptor for a specific source is dependent upon the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise are defined below.

- Maximum Noise Level (Lmax): The maximum instantaneous noise level during a specific period of time.
- Minimum Noise Level (Lmin): The minimum instantaneous noise level during a specific period of time.
- Energy Equivalent Noise Level (Leq): The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.
- Day-Night Noise Level (Ldn): The 24 hour Leq with a 10 dBA “penalty” for noise events that occur during the noise sensitive hours between 10:00 PM and 7:00 AM. In other words, 10 dBA is added to noise events that occur in the nighttime hours to account for increased human sensitivity to noise during these hours.
- Community Noise Equivalent Level (CNEL): The CNEL is similar to the Ldn described above, but with an additional 5 dBA “penalty” added to noise events that occur in the evening between the hours of 7:00 PM to 10:00 PM. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated Ldn.
- Single Event Noise Level (SEL): The SEL describes a receiver’s cumulative noise exposure from a single noise event, which is defined as an acoustical event of short duration and involves a change in sound pressure above a reference value.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels. Typical community noise levels are depicted in **Table 4.10-1**.

**TABLE 4.10-1
TYPICAL COMMUNITY NOISE LEVELS**

INDOORS	A-Weighted Decibels	Perceived Loudness Relative To 60 dBA	OUTDOORS
	140	Threshold of Pain	x256
			Military Jet Takeoff with Afterburner (at 50 feet)
	130		x128
		Deafening	
	120		x64
		Uncomfortably Loud	Jet Takeoff at 200 Feet
Rock Band	110		x32
		Uncomfortably Loud	747-100 Takeoff (4 Miles From Start of Roll)
Inside Subway Train, New York	100		x16
		Uncomfortably Loud	Power Lawnmower (at 50 Feet) Ambulance Siren (at 100 Feet)
Noisy Cocktail Bar	90		x8
		Very Loud	727-200 Takeoff (4 Miles From Start of Roll)
Jet Aircraft Cabin, at Cruise Shouting (at 3 Feet)	80		x4
		Very Loud	Diesel Truck, 40 mph (at 50 Feet)
Noisy Restaurant		Very Loud	Automobile, 65 mph (at 50 Feet)
Vacuum Cleaner at 3 Feet	70		x2
		Moderately Loud	757-200 Takeoff (4 Miles From Start of Roll)
Large Business Office		Moderately Loud	Automobile, 30 mph (at 50 Feet)
Normal Conversation (at 3 Feet)	60		x1
		Moderately Loud	Cessna 172 Landing (3,300 Feet From Rwy End)
Quiet Office		Moderately Quiet	
	50		x1/2
		Moderately Quiet	
	40		x1/4
Quiet Library		Moderately Quiet	Quiet Urban Area, Nighttime Quiet Suburban Area, Nighttime
	30		x1/8
Concert Hall, Background		Very Quiet	Quiet Rural Area, Nighttime
	20		x1/16
Recording Studio		Very Quiet	
	10		x1/32
		Barely Audible	Leaves Rustling
	0	Threshold of Hearing	x1/64

Sources: Ormat 2010, p. 3

4.10 NOISE

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called "ambient" environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged. Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans.
- Outside of the laboratory, a 3dB change is required before any noticeable difference can be perceived by humans.
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial.
- A 10-dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response. (Ormat 2010, p. 3)

When evaluating noise impacts, increases in ambient noise levels need to also take into account the existing noise environment. Consequently, increases in cumulative noise exposure (in CNEL/L_{dn}) of 5 dBA are generally considered significant in areas where the ambient noise environment is less than 60 dBA. In areas where the ambient noise environment is between 60 and 65 dBA, increases of 3.0 dBA, or greater, would be considered significant. In areas where the ambient noise environment exceeds 65 dBA, a predicted increase of 1.5 dBA, or greater, would be considered significant. These thresholds were initially recommended by the Federal Interagency Committee on Noise (FICON) in 1972, based on noise levels at which people typically became increasingly annoyed.

EXISTING CONDITIONS

Project Site

Currently, the project site is cultivated with agricultural crops. Primary sources of noise in the project area include aircraft overflight, agricultural equipment, and vehicle traffic. Noise sources associated with agricultural operations include the field machinery, especially diesel-engine-driven heavy trucks, used for the delivery of supplies and the distribution of products, and aircraft, used for the spraying of crops. Typical noise emissions from agricultural operations range from 69 to 77 dBA at 50 feet (Ormat 2008, p. 6).

Project Site

The project site is located in central Imperial County, California, in a rural area approximately 1.5 miles north of the City of Brawley. The project vicinity is actively cultivated, and irrigation canals and drains border most fields. The project site is characterized by agricultural fields (both active and fallow) with a few rural houses and farm-related structures. Large storage silos are on the north end of the project area, and a feedlot is just south of the project area on Shank Road.

The nearest general airport is the Brawley Municipal Airport, located approximately 1.3 miles southwest of the project site. According to the Imperial County Airport Land Use Compatibility Plan, the majority of the project site is located just outside of the Compatibility Zones for this airport (see **Figure 4.7-1**). The southern portion of the project site, which is proposed only for development of wells, is located within Compatibility Zone C, Common Traffic Patterns. The project site's western boundary is defined by the noise-generating Union Pacific Railroad (UPRR) line.

EXISTING NOISE-SENSITIVE LAND USES

Noise-Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses that would result in noise exposure which could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings, including senior housing, are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreational areas are also considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places, where low interior noise levels are essential, are also considered noise-sensitive land uses.

The project area is a rural, agricultural area with scattered residential development. The residences immediately east of the power plant site (360 feet) will be relocated outside of the project area, prior to the startup of the power plant. The nearest remaining residences to the proposed plant site and wells are identified in **Table 4.10-2** below and shown in **Figure 4.10-1**.

TABLE 4.10-2
SENSITIVE NOISE RECEPTORS

Noise Source Location	Distance to Nearest Residences
Well Sites (nearest wells to residences below)	
Well #83-15	Approximately 0.2 miles west
Well #87-10	Approximately 0.15 miles west
Geothermal Plant	
East Brawley Power Plant Site	Approximately 0.25 miles south
East Brawley Power Plant Site	Approximately 0.4 miles northeast
East Brawley Power Plant Site	Approximately 0.9 miles northeast

Source: Ormat 2008, p. 5

Ambient Noise Environment

The southern boundary of the project area is just north of the Brawley city limits, within the City's sphere of influence, as well as the State Route (SR) 111 bypass (which is currently under construction). This area is zoned M-1 Light Manufacturing. The southwestern boundary of the project area is located near the Del Rio Country Club bounded by the New River. The areas immediately east and west of the project area are designated for agricultural uses with the Brawley Wastewater Treatment Plant (BWWTP) located farther to the west. The land to the north

4.10 NOISE

and east is agricultural. The eastern boundary of the project is Dietrich Road and to the north is Rutherford Road.

The majority of the project area is located along Best Road from Shank to Rutherford roads. Additionally, an at-grade intersection at the SR 111 bypass and Best Road has recently been constructed. This crossing will provide access to the power plant site and well field. The proposed well pads may be accessed from other county roads in the vicinity including Dietrich, Groshen, Rutherford, Ward, and Wills roads. Lastly, some well pads may be accessed via unimproved farm roads and Imperial Irrigation District (IID) canal roads.

Primary sources of noise in the project area include aircraft overflight, agricultural equipment, and vehicle traffic (Ormat 2010, p. 6). The predominant land use in the area is agriculture. Noise sources associated with agricultural operations include the field machinery and aircraft. Typical electric pump noise emissions from agricultural operations range from 69 to 77 dBA at 50 feet.

Ambient Noise Conditions

In September 2010, noise levels were measured at the residence on Best Road about 0.4 miles northeast of the proposed plant site to obtain a baseline ambient noise level. Results of these measurements are provided in **Table 4.10-3**.

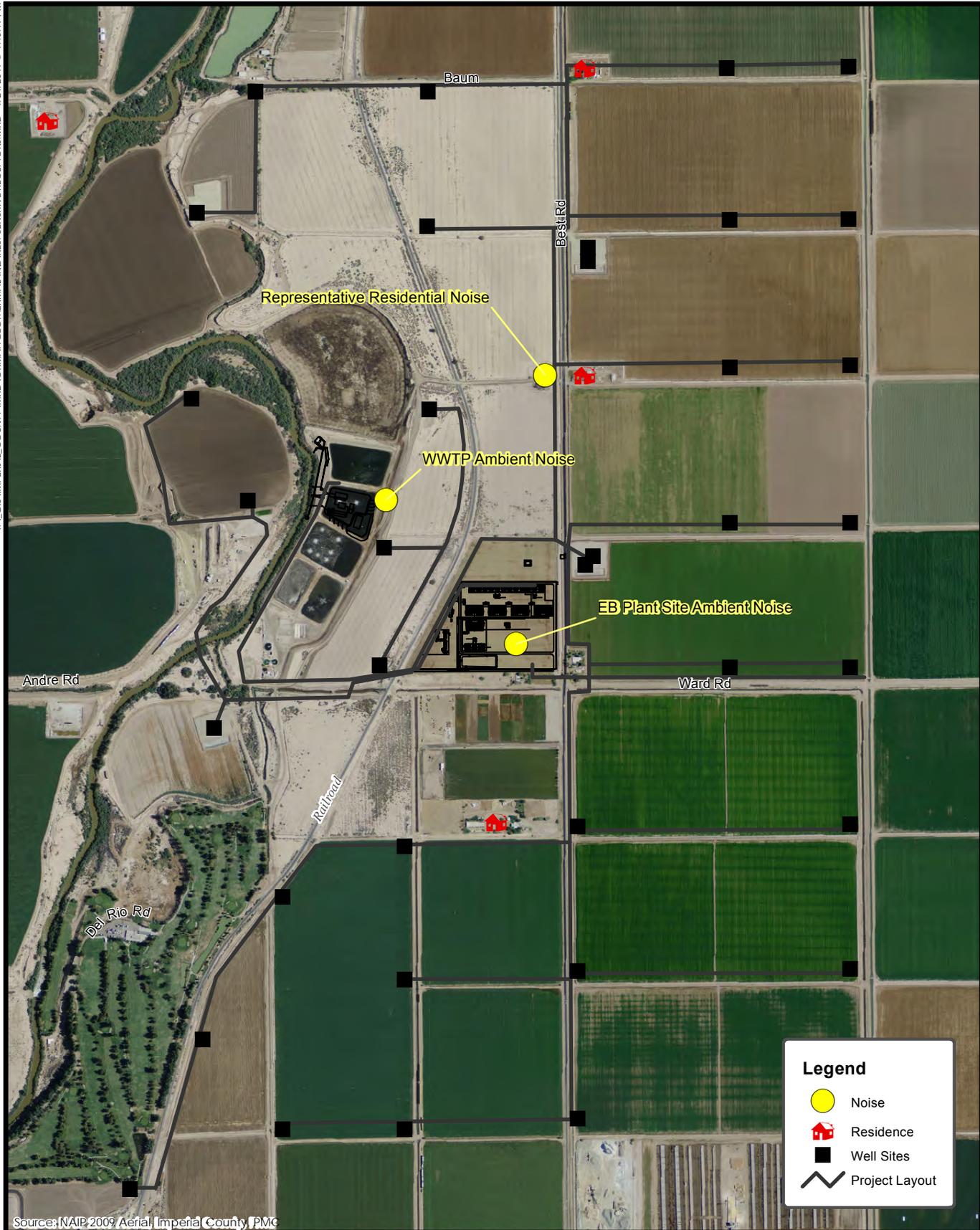
TABLE 4.10-3
AMBIENT NOISE MEASUREMENTS

Ambient Noise Measurement Location	Day/Date	Time of Measurement	Length of Measurement	Average Noise Level (L_{eq} , dBA)
East Brawley Plant Site Ambient Noise	Thursday, September 16, 2010	9:10 AM	30 minutes	55.6
BWWTP Ambient Noise	Thursday, September 16, 2010	9:50 AM	30 minutes	63.2
Representative Residence	Thursday, September 16, 2010	10:35 AM	30 minutes	59.2

Due to the location of the residence in relation to the existing plant and to Best Road, it was chosen as the best example of an average location where sensitive receptors are located. The resulting average noise level was 59.2 dBA over a period of 30 minutes. The location of the ambient noise measurement areas, residences, and closest proposed well sites in relation to the proposed facility site are presented in **Figure 4.10-1**.

During this period, existing noise sources were personal vehicles and agricultural-related trucks/equipment driving by on Best Road, as well as agricultural irrigation noise. Peak noise levels went up to 65 to 70 dBA when vehicles/trucks drove by. This noise level and noise sources near this residence are typical of the area and representative of the other residences in the area.

Noise was also measured on the proposed plant site (**Figure 4.10-1**). The average noise level was about 55.6 dBA, approximately 500 feet from the road, with the primary noise being from vehicle and truck noise on Best Road.



Source: NAIP 2009 Aerial, Imperial County, PMC

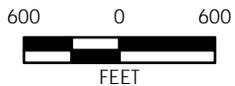


Figure 4.10-1
Nearest Sensitive Receptors

Noise was also measured on the northeastern property line of the Brawley Wastewater Treatment Plant (BWWTP). There was extensive construction occurring on the southern half of the BWWTP property, but the selected noise location was far enough away so that it did not pick up the construction noise and would be more representative of the normal noise levels in the northern part of the property near the ponds. Most of the noise in this area came from the water aeration units on the ponds. The average noise level was measured at 63.2 dBA.

Existing Railroad Noise

The project site experiences noise level impacts from operations on the Union Pacific Railroad (UPRR) line located along the western boundary of the plant site. The Wyle Labs WCR 73-5 Rail Noise Model was used to assess the expected noise levels associated with freight train operations at distances of 100, 200, 400, and 1,940 feet. According to the Union Pacific, the Union Pacific line that travels through the project site originates from Calexico and is considered an industrial lead, not a mainline (Union Pacific 2009). Due to the nature of an industrial lead line, the number of daily train passes was estimated using information provided by the U.S. Department of Transportation, Crossing Inventory Information. **Table 4.10-4** presents the expected noise level impacts at distances of 100, 200, 400, and 1,940 feet for both existing and future conditions.

TABLE 4.10-4
EXISTING NOISE IMPACT LEVELS (DBA CNEL)

Existing Condition	Number of Daily Trips	CNEL at 100 Feet from UPRR Line	CNEL at 200 Feet from UPRR Line	CNEL at 400 Feet from UPRR Line	CNEL at 1,940 Feet from UPRR Line
	2	55.9	52.3	47.7	37.3

4.10.2 REGULATORY FRAMEWORK

FEDERAL

Federal Transit Administration

Currently, the County of Imperial does not have regulations regarding vibration impact criteria. However, the Federal Transit Administration (FTA) publication, Transit Noise and Vibration Noise Impact Assessment (2006), established vibration standards. The criteria for acceptable groundborne vibration are expressed in terms of root-mean-square (RMS) velocity levels in decibels. The criteria are related to groundborne vibration causing human annoyance or interfering with use of vibration-sensitive equipment.

Structural Response Criteria

Vibration tolerance criteria typically depend on the type of structures that are affected. Structural response to vibration is typically evaluated in terms of peak particle velocity (PPV), which is often used since it is related to the stresses that are experienced by buildings. Various general standards are contained in the International Standards Organization standards 3945, 4866, and 7626-1. Limits set by these standards indicate a low probability of structural damage occurring to common structures at a PPV of 2.0 inches per second. Older (and non-reinforced) masonry structures would have a limit of 0.75 to 1.0 inches per second. The FTA identifies a vibration damage threshold criterion of 0.20 inches per second for non-engineered timber and

4.10 NOISE

masonry buildings (i.e., fragile buildings) or 0.12 inches per second for buildings extremely susceptible to vibration (i.e., fragile historic buildings).

STATE

The State of California regulates vehicular and freeway noise affecting classrooms, sets standards for sound transmission and occupational noise control, and identifies noise insulation standards and airport noise/land use compatibility criteria. The State of California General Plan Guidelines (2003), published by the Governor's Office of Planning and Research, also provides guidance for the acceptability of projects within specific CNEL/L_{dn} contours. The guidelines present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. The County of Imperial has utilized the adjustment factors provided and has modified the state's land use compatibility standards for the purpose of implementing the Noise Element of its General Plan. **Table 4.10-6** summarizes the acceptable and unacceptable community noise exposure limits for various land use categories as currently defined by the State of California.

LOCAL

County of Imperial

County of Imperial General Plan

The Imperial County General Plan Noise Element contains policies regarding noise standards. **Table 4.10-5** analyzes the consistency of the project with the applicable policies relating to noise in the Imperial County General Plan.

While this Draft EIR analyzes the proposed East Brawley Geothermal Development project's consistency with the Imperial County General Plan, pursuant to California Environmental Quality Act (CEQA) Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

**TABLE 4.10-5
PROJECT CONSISTENCY WITH GENERAL PLAN NOISE POLICIES**

General Plan Policies	Consistency with General Plan	Analysis
1. Acoustical Analysis of Proposed Projects The County shall require the analysis of proposed discretionary projects which may generate excessive noise or which may be impacted by existing excessive noise levels.	Yes	A noise study has been completed for the project. Short- and long-term impacts were found to be less than significant.
2. Noise/Land Use Compatibility Where acoustical analysis of a proposed project is required, the County shall identify and evaluate potential noise/land use conflicts that could result from the implementation of the project. Projects which result in noise levels that exceed the "Normally Acceptable" criteria of the Noise/Land Use Compatibility Guidelines shall include	Yes	Refer to analysis of Policy 1.

General Plan Policies	Consistency with General Plan	Analysis
mitigation measures to eliminate or reduce to an acceptable level the adverse noise impacts.		
3. Interior Noise Environment Where acoustical analysis of a proposed project is required, the County shall identify and evaluate projects to ensure compliance to the California (Title 24) interior noise standards and the additional requirement of this Element.	Yes	Refer to analysis of Policy 1.
4. New Noise Generating Projects The County shall identify and evaluate projects which have the potential to generate noise in excess of the Property Line Noise Limits. An acoustical analysis must be submitted which demonstrates the project's compliance.	Yes	Refer to analysis of Policy 1.
5. Projects Which Generate Off-Site Traffic Noise The acoustical analysis shall identify and evaluate projects which will generate traffic and increase noise levels on off-site roadways. If the project site has the potential to cause a significant noise impact to sensitive receptors along those roadways, the acoustical analysis report shall consider noise reduction measures to reduce the impact to a less than significant level.	Yes	Refer to analysis of Policy 1.

Noise Standards

The County has established noise guidelines in the Noise Element of the General Plan. These guidelines identify compatible exterior noise levels for various land use types. The maximum allowable noise exposure for various land uses are depicted in **Table 4.10-6** below. As shown in the table, the normally acceptable exterior noise level for residential uses is 60 dB CNEL. Exterior noise levels above 60 dB CNEL (up to 70 dB CNEL) are conditionally acceptable for residential uses "after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design." Commercial uses are subject to a maximum normally acceptable exterior noise level of 65 dB CNEL, while playgrounds and neighborhood parks are 70 dB CNEL (County of Imperial 1993).

As defined in the Imperial General Plan Noise Element, sensitive noise receptors are, in general, areas of habitation where the intrusion of noise has the potential to adversely impact the occupancy, use or employment of the environment. Sensitive receptors include, but are not limited to, residences, schools, hospitals, parks, and office buildings. Sensitive receptors may also be non-human species.

4.10 NOISE

**TABLE 4.10-6
LAND USE COMPATIBILITY**

Land Use Category	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential	To 60 dB	60–70 dB	70–75 dB	Over 75 dB
Transient Lodging – Motels, Hotels	To 60 dB	60–75 dB	75–80 dB	Over 80 dB
Schools, Libraries, Churches, Hospitals, Nursing Homes	To 60 dB	60–70 dB	70–80 dB	Over 80 dB
Auditoriums, Concert Halls, Amphitheatres	–	To 70 dB	–	Over 70 dB
Sports Arena, Outdoor Spectator Sports	–	To 70 dB	70–75 dB	Over 75 dB
Playgrounds, Neighborhood Parks	To 70 dB	–	70–75 dB	Over 75 dB
Golf Courses, Riding Stables, Water Recreation, Cemeteries	To 70 dB	–	70–80 dB	Over 80 dB
Office Buildings, Business Commercial and Professional	To 65 dB	65–75 dB	75–80 dB	Over 80 dB
Industrial, Manufacturing, Utilities, Agriculture	To 70 dB	70–75 dB	75–80 dB	Over 80 dB

Source: County of Imperial 1993

Construction Noise

Per the Noise Element of the Imperial County General Plan, impacts from construction are defined as construction noise from a single piece of construction equipment or a combination of equipment that exceeds 75 dBA Leq when averaged over an 8-hour period and measured at the nearest sensitive receptor (e.g., residences, schools, hospitals, parks, office buildings, and certain non-human species, including riparian bird species). In cases of extended length construction times, the standard may be tightened so as not to exceed 75 dB Leq when averaged over a one-hour period.

The County's General Plan limits sound levels from construction activities during specific hours of the day and night through a set of construction noise standards presented below in **Table 4.10-7**. The standards apply to the noise measured at the nearest sensitive receptor.

**TABLE 4.10-7
COUNTY OF IMPERIAL CONSTRUCTION NOISE STANDARDS**

Construction Duration	Sound Level (dB Leq)	Averaging Period	Hours of Operation Restriction
Short-Term (days or weeks)	75	8 hours	7 AM – 7 PM Monday to Friday 9 AM – 5 PM Saturday No commercial construction operation is permitted on Sundays and holidays.
Extended Periods	75	1 hour	7 AM – 7 PM Monday to Friday 9 AM – 5 PM Saturday No commercial construction operation is permitted on Sundays and holidays.

Source: County of Imperial 1993

The Noise Element also states that construction equipment operation be limited to the hours of 7 AM to 7 PM, Monday through Friday, and 9 AM to 5 PM Saturday. However, Ormat would perform construction during nighttime hours to avoid heat illnesses of construction workers. The geothermal section of the Land Use Ordinance (Section 91702.01(S)) also allows drilling on a 24-hour basis provided the other standards of the geothermal code are met.

Operational Noise

The County’s General Plan Noise Element includes property line noise limits, listed in **Table 4.10-8**, that apply to noise generation from one property to an adjacent property.

The Noise Element contains guidelines for compatibility among various land uses. The land use zoning in the project area is General Agricultural/Geothermal. The noise/land use compatibility guidelines for agricultural land use specified in the Noise Element indicate that specified land uses are normally acceptable when the CNEL is less than 70 dB. New construction or development is conditionally acceptable when the CNEL ranges from 70 to 75 dB. It is normally unacceptable when the CNEL ranges from 75 to 80 dB and clearly unacceptable when the CNEL is over 80 dB. Noise levels of up to 60 dBA (CNEL) are normally acceptable for residential development and noise levels of up to 70 dBA (L_{dn} or CNEL) are conditionally acceptable. If noise levels due to the proposed project exceed these levels, impacts may be considered significant.

According to the Noise Element, if future noise levels from a project are within the normally acceptable noise level guideline, but result in an increase of 5 dB CNEL or greater, the project would have a potentially significant impact and mitigation measures must be considered. If the future noise level after the project is completed is greater than the normally acceptable noise level, a noise increase of 3 dB CNEL or greater should be considered a potentially significant noise impact and mitigation measures must be considered.

**TABLE 4.10-8
IMPERIAL COUNTY NOISE/LAND USE COMPATIBILITY GUIDELINES**

Land Use Category	Exterior Noise Exposure L _{dn} or CNEL, dB					
	55	60	65	70	75	80
Residential	Black					
	White	Light Gray	Light Gray	Vertical Lines		
	White				Horizontal Lines	Horizontal Lines
Transient Lodging – Motels, Hotels	Black					
	White	Light Gray	Light Gray	Light Gray	Vertical Lines	
	White					Horizontal Lines
Schools, Libraries, Churches, Hospitals, Nursing Homes	Black					
	White	Light Gray	Light Gray	Vertical Lines	Vertical Lines	
	White					Horizontal Lines

4.10 NOISE

Land Use Category	Exterior Noise Exposure L _{dn} or CNEL, dB					
	55	60	65	70	75	80
Auditoriums, Concert Halls, Amphitheaters						
Sports Arena, Outdoor Spectator Sports						
Playgrounds, Neighborhood Parks						
Golf Courses, Riding Stables, Water Recreation, Cemeteries						
Office Buildings, Business Commercial and Professional						
Industrial, Manufacturing Utilities, Agriculture						

Interpretation (for Land Use Planning Purposes)



Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any building involved are of normal conventional constructions, without any special noise insulation requirements.



Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.



Normally Unacceptable: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.



Clearly Unacceptable: New construction or development clearly should not be undertaken.

Source: County of Imperial 1993

IMPERIAL COUNTY LAND USE ORDINANCE, NOISE ABATEMENT AND CONTROL

Noise-generating sources in Imperial County are regulated by the County of Imperial Codified Ordinances, Title 9, Division 7. The sound limits apply to noise generation from one property to an adjacent property. The sound level limits depend on the time of day and the receiving land use. The sound level limits are depicted in **Table 4.10-9**. The sound level limits must not be exceeded on or beyond the boundaries of the property on which the noise is produced. The sound level limit between two zoning districts (different land uses) is measured at the property line between the properties.

**TABLE 4.10-9
COUNTY OF IMPERIAL SOUND LEVEL LIMITS**

Land Use Zone	Time of Day	One-Hour Average Sound Level (dBA)
Residential (all R1)	7:00 AM to 10:00 PM	50
	10:00 PM to 7:00 AM	45
Residential (all R2, R3, R4 and other residential)	7:00 AM to 10:00 PM	55
	10:00 PM to 7:00 AM	50
Commercial	7:00 AM to 10:00 PM	60
	10:00 PM to 7:00 AM	55
Manufacturing, all other industrial, including agricultural and extraction industry	Anytime	70
General Industrial	Anytime	75

Source: County of Imperial 1993

Groundborne Vibration

Vibration is sound radiated through the ground. Groundborne noise is the rumbling sound caused by the vibration of building interior surfaces. The ground motion caused by vibration is measured in peak particle velocity (PPV) in inches per second and is referenced as vibration decibels (VdB). Typical outdoor sources of perceptible groundborne vibration are construction equipment and traffic on rough roads.

The American National Institute indicates that vibration levels in critical care areas, such as hospital surgical rooms and laboratories, should not exceed 0.2 inch per second of PPV. The Federal Transit Administration (FTA) also uses a PPV of 0.12 inch per second for extremely fragile historic buildings. The FTA criteria for infrequent groundborne vibration events (less than 30 events per day) that may cause annoyance are 80 VdB for residences and buildings where people normally sleep and institutional land uses with primarily daytime uses. Although the UPRR runs adjacent to the project site, there are no sensitive receptors proposed as part of the project. Additionally, the distance between the construction sites and closest sensitive receptors is ¼ to 1 mile, and sensitive receptors would not be directly impacted by vibration caused by the construction activity. Vibration is therefore not included as a part of this analysis.

4.10.3 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

State CEQA Guidelines (Appendix G) states that implementation of a project would result in significant noise impacts if the project would result in any of the following:

- 1) Exposure of persons to, or generation of, noise levels in excess of standards established in local plans or ordinances.
- 2) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

4.10 NOISE

- 3) A substantial permanent increase in ambient noise levels in the project vicinity above levels without the project.
- 4) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
- 5) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, where the project would expose people residing or working in the area to excessive noise levels.
- 6) For a project within the vicinity of a private airstrip, where the project would expose people residing or working in the project area to excessive noise levels.

METHODOLOGY

Noise levels resulting from proposed construction activities were obtained from reports prepared by the Federal Transit Administration and field data from files. The noise impact assessment utilized criteria established in the Imperial County General Plan Noise Element and the Imperial County Noise Ordinance. According to the traffic report prepared for the proposed project, an additional 84 average daily trips will be added to the region as a result of implementation of the proposed project. This does not represent a significant increase in existing noise levels. Therefore, the noise levels associated with project traffic were not included in this analysis.

On-site noise-generating activities associated with the proposed project would include short-term construction noise and mechanical equipment noise related to the normal binary power plant operations. The principal noise sources would be turbine operations, noise generated from the cooling towers, and associated project vehicles.

The proposed project also includes upgrades to, and the operation of, the City of Brawley's Wastewater Treatment Plant to include a tertiary treatment system to further clean the wastewater effluent to enable the project proponent to use or recycle this water to the power plant facility to use as makeup water for the cooling towers of the geothermal plant. This tertiary treatment plant would be built within the confines of the current wastewater treatment facility, and there would be no new expansion of the current footprint of the facility.

Noise-Reducing Project Design Features

The project applicant has identified best management practices (BMPs) that are proposed to be implemented to reduce noise levels. Incorporation of these measures into the project design or required by regulation would avoid or reduce potentially significant impacts.

The applicant-proposed measures were identified in the Conditional Use Permit application and environmental analysis along with additional measures from the Imperial County Land Use Ordinance specific to geothermal projects (Division 17). The impact analysis assumes that all of these measures will be implemented. Additional mitigation measures are recommended if it is determined that the measures below will not fully mitigate the impacts for which they are presented.

Ormat will comply with County-specified noise control measures, including:

1. The drilling operator shall limit drilling noise to a sound level equivalent to CNEL 60 dBA as measured at the nearest human receptor outside the parcel boundary. This level may be

exceeded by 10 percent if the noise is intermittent and during daylight hours. (Land Use Ordinance 91702.01(B))

2. Diesel equipment used for drilling within 300 feet of any residence shall have hospital-type mufflers. Well venting and testing at these wells shall be accompanied by the use of an effective muffling device or silencer. (Land Use Ordinance 91702.01(D))
3. Heavy truck traffic, well site preparation, pipe stacking, and hydroblasting (used for descaling operations) shall be limited to the hours between 7:00 AM and 7:00 PM for any wells within 300 feet of any residence. Exceptions may be made where soundproofing is provided or during summer hours to minimize effects of heat with notice to the planning director and approval thereof. (Land Use Ordinance 91702.01(I and M))
4. Impulse noises such as sudden steam venting shall be controlled by discharge through a muffler or other sound-attenuating system, as appropriate. (Land Use Ordinance 91702.01(O))
5. Drilling may be on a 24-hour basis provided the standards above are met. (Land Use Ordinance 91702.01(S))
6. As a best management practice, unnecessary construction vehicle use and idling time shall be minimized by project construction crews and during project operations. The ability to limit construction vehicle idling time is dependent upon the sequence of construction activities and when and where vehicles are needed or staged. A common-sense approach to vehicle use shall be applied; if a vehicle is not required for use immediately or continuously for construction activities, its engine shall be shut off. (Note: Certain equipment, such as large diesel-powered vehicles, requires extended idling for warm-up and repetitive construction tasks.)

PROJECT IMPACTS AND MITIGATION MEASURES

Temporary Construction Noise Impacts Off-Site

Impact 4.10.1 During the construction phases, implementation of the proposed project could result in temporary increased noise levels that may exceed Imperial County standards at adjacent noise-sensitive receptors off-site. The project proposes to implement best management practices to reduce noise levels, including the minimization of unnecessary construction vehicle use and idling time. This impact is considered **less than significant**.

Construction of the proposed power plant would involve the short-term use of heavy equipment such as backhoes, cranes, loaders, dozers, graders, excavators, compressors, generators, and various trucks for mobilizing crew, transporting construction material and debris, line work, and site watering. Construction of the wells would require use of drill rigs and large augers at each well location. Proposed improvements at the BWWTP would require minimal equipment, including trucks for mobilizing crew and transporting equipment. The principal noise sources during construction would be the diesel engines on the construction equipment and drilling rig and the movement of pipes and casing. Construction of the power plant is anticipated to last a total of 15 months. BWWTP improvements are anticipated to last a total of 11 months.

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TABLE 4.10-10
PROJECTED NOISE LEVELS AT NEAREST SENSITIVE RECEPTORS DURING CONSTRUCTION

Noise Source Location	Distance to Nearest Residences	Projected Sound Level from the Project at the Nearest Residence ^a
Construction of Power Plant	Approximately 0.25 miles south	55 dBA
Construction of Wells ^b		
Well #83-15	Approximately 0.2 miles west	57 dBA (during 20-day construction only)
Well #87-10	Approximately 0.15 miles west	59 dBA (during 20-day construction only)

Notes: a. Excludes background noise; b. Closest wells to residences

Construction noise is usually made up of intermittent peaks and continuous lower levels of noise from equipment cycling through use. Noise levels associated with individual pieces of equipment can generally range between 70 and 90 dBA (Ormat 2010, p. 9). The maximum instantaneous construction noise level for this analysis is 83 dBA at a distance of 50 feet from any work site (for both site construction and well drilling activities) (Ormat 2010, p. 9).

The nearest sensitive noise receptors would be the residents at the two homes in the project area as indicated in **Table 4.10-10**. Imperial County limits sound levels from construction activities to 75 dBA when averaged over an eight-hour period and measured at the nearest sensitive receptor. As shown on **Table 4.10-10**, construction noise levels at the sensitive receptors closest to the wells have the potential to reach up to 57 dBA. Therefore, all calculated noise levels fall within the normally acceptable range of the guidance set forth in the Imperial County General Plan Noise Element.

However, some plant construction activities will take place on a 24-hour basis, seven days per week, including nighttime work, especially during the summer to avoid work during the heat of the day. County noise standards only apply during the County's permitted construction hours, which are limited to daylight hours on weekdays (see **Table 4.10-7**). Therefore, the possibility exists for noise levels to exceed the County significance criteria described above during extended construction hours.

The proposed project will be required to comply with all applicable noise control measures contained in the County General Plan Noise Element and Noise Ordinance. In addition, the project will be required to comply with the standards of Division 17 (Geothermal) of the County's Land Use Ordinance, which include specific standards and monitoring requirements for noise associated with well drilling. The project also proposes to implement best management practices to reduce noise levels, including the minimization of unnecessary construction vehicle use and idling time. Compliance with these existing regulations and minimization of vehicle use and idling would ensure that noise levels do not exceed applicable standards. This impact is **less than significant**.

Mitigation Measures

None required.

Off-Site Operations-Related Noise Impacts

Impact 4.10.2 Implementation of the proposed project would not result in a substantial increase in ambient noise levels at off-site noise-sensitive receptors or exceed

the Imperial County standards for exterior noise levels. This would be a **less than significant** impact.

Plant Operations

The principal noise sources would be turbine operations, noise generated from the cooling towers, and associated project vehicles. Typically, the loudest component of power plant operations is the noise from the cooling towers. Noise was measured at various distances from the northern cooling tower of the North Brawley geothermal power plant. The average noise level from these measurements was 52.5 dBA at 0.25 miles. This measurement would be fairly representative of the proposed East Brawley power plant, although the North Brawley noise level is slightly higher due to a louder gas treatment system. This noise level would be less than the existing background noise in the area at distances of 0.25 miles and greater.

Production Wells

Other noise sources from ongoing operation are production pumps. Noise measured from two operational and representative production wells (88-17 and 61-21) for North Brawley was 80.1 dBA at 25 feet, which calculates to about 68 dBA at 100 feet. For the nearest residents to proposed wells, the noise levels would be 47 to 53 dBA, which is also below or around existing ambient noise levels. Injection wells are silent as the fluid is injected under pressure, not pumped.

Wastewater Treatment Facility

Another aspect of the proposed project would be operation of a tertiary treatment system at the adjacent Brawley Wastewater Treatment Plant. The only noise sources of this system may include some electric-powered pumps, but it is expected that the noise would be less than the existing aeration systems in the ponds where the tertiary treatment system would be located. This system is also located in a basin where noise does not easily travel to outlying areas. Noise from this system would be inaudible at the nearest is located at a distance of approximately 0.25 miles.

Table 4.10-11 provides an estimate of the projected noise level from the proposed project at the nearest residences. As shown, the three nearest residences to the proposed plant site range from 0.25 to almost 1 mile away. Sound levels from ongoing operations from the proposed project at these nearest residences are projected to range from 41 to 53 dBA.

**TABLE 4.10-11
OPERATIONS-GENERATED NOISE LEVELS AT CLOSEST SENSITIVE RECEPTORS**

Distance to Nearest Residences	Projected Sound Level from the Project at the Nearest Residence ^a
Approximately 0.25 miles south	53 dBA
Approximately 0.4 miles northeast	48 dBA
Approximately 0.9 miles northeast	41 dBA

Note: a. excludes background noise

4.10 NOISE

The noise levels produced from the plant operations, production wells, and wastewater treatment facility would be below the significance criteria. Therefore, the noise impact from the proposed project would be **less than significant**.

Mitigation Measures

None required.

4.10.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for noise includes development surrounding the project site. A list of cumulative projects that were included as part of the assumptions used in developing the baseline cumulative conditions is included in **Table 4.0-1** in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this DEIR. Future cumulative noise levels in the vicinity of the project site would be primarily influenced by vehicle traffic along area roadways.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Project-Generated Noise Impact

Impact 4.10.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase ambient noise but would not exceed the 3 dBA threshold. Therefore, this impact is considered **less than cumulatively considerable**.

The proposed project is predicted to create a total of 84 average daily trips on the region's roadways. This small number of vehicles would not lead to an increase in ambient noise levels adjacent to the project site or in the region.

As described in Impact 4.10.2, the proposed project's operational contributions to the ambient noise levels are considered less than significant for the immediate surrounding sensitive receptors. Therefore, the contribution to cumulative noise levels would be **less than cumulatively considerable**.

Mitigation Measures

None required.

REFERENCES

- County of Imperial. 1993. *Imperial County General Plan, Noise Element*.
- Federal Transit Administration (FTA). 2006. *Transit Noise and Vibration Noise Impact Assessment*.
- Ormat Nevada Inc. 2010. *Noise Impact Assessment, East Brawley Geothermal Development Project*.
- State of California, Department of Transportation (Caltrans). 2002. *California Airport Land Use Planning Handbook*.
- State of California, Governor's Office of Planning and Research. 2003. *State of California General Plan Guidelines*.
- Union Pacific Railroad. 2009. Correspondence from Lupe C. Valdez, Director Public Affairs. October 19.
- U.S. Department of Housing and Urban Development, Office of Community Planning and Development. 2004. *The Noise Guidebook*.

4.11 PUBLIC SERVICES

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) includes an assessment of the significance for identified public services and an evaluation of potential impacts to public services that could result from implementation of the proposed East Brawley Geothermal Development project. Public services include fire protection services, law enforcement, and solid waste collection and disposal. Each subsection includes descriptions of existing facilities, service standards, potential environmental impacts resulting from implementation of the proposed project, mitigation measures where appropriate, and cumulative impacts. The reader is referred to Section 4.13, Utilities, for information regarding impacts related to water supply, wastewater, and other utilities.

Note: Schools are typically discussed as part of public services. However, the proposed project is a geothermal power plant and would not generate demand for schools in association with the temporary construction workforce or the minimal number of employees that would operate the plant. Therefore, no impacts to schools would occur in association with the proposed project, and this issue will not be addressed in this Draft EIR.

4.11.1 FIRE PROTECTION

4.11.1.1 EXISTING SETTING

IMPERIAL COUNTY FIRE DEPARTMENT

The proposed project is located in unincorporated Imperial County adjacent to the City of Brawley. The project site is located within the Imperial County Fire Department and Office of Emergency Services (ICFD/OES) service area. The department is responsible for service in the entire county, covering an area of 4,597 acres. The Imperial County Fire Department (ICFD) responds to fire, medical, rescue, hazardous materials, prevention, and hazardous device incidents.

The facilities serving the project area would include the Imperial County Fire Department located at 2514 La Brucherie Road in Imperial, approximately 13 miles south of the project site, and the City of Brawley's fire station at 815 Main Street, approximately 2.5 miles from the project site. The City of Brawley Fire Department is contracted through the County to provide first response to emergencies in the project area. County engines from ICFD would be staffed with three personnel. The engine from the City of Brawley would have a minimum of two persons (Rouhotas 2010).

The Imperial County Fire Department responds to between 3,500 and 4,000 service calls annually (Rouhotas 2010). The department is funded through property taxes and a contribution from the County General Fund. Additional funds come through development fees levied in accordance with Ordinance 1418.

Response Times and Service Standards

The National Fire Protection Association (NFPA) is an international nonprofit organization that provides consensus codes and standards, research, training, and education on fire prevention and public safety. NFPA standards are intended to minimize the possibility and effects of fire and other risks. Based on NFPA standards, the ICFD has a service standard goal of responding to calls within 5 minutes, 80 percent of the time (NFPA 2010). The ICFD's current average response time for all incidents is 5 minutes, 11 seconds. Response times in Imperial County vary based on the location of the incident relative to the nearest station. The service area encompasses 4,597 acres (Rouhotas 2010).

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Insurance Services Offices Rating

The Insurance Services Office (ISO) is an independent organization that serves insurance companies, fire departments, insurance regulators, and others by providing information about risk. ISO's Public Protection Classification (PPC) service gauges the quality of local fire departments by collecting information on a community's public fire protection and then analyzing the data using a Fire Suppression Rating Schedule. ISO then assigns a PPC from 1 to 10. Class 1 represents the best public protection, and Class 10 indicates no recognized protection. A community's PPC depends on the following criteria (ISO 2010):

- Fire alarm and communications systems, including telephone systems, telephone lines, staffing, and dispatching systems;
- The fire department, including equipment, staffing, training, and geographic distribution of fire companies; and
- The water supply system, including condition and maintenance of hydrants, and a careful evaluation of the amount of available water compared with the amount needed to suppress fires.

Currently, the Imperial County Fire Department has an ISO ratio of 9, and the City of Brawley has an ISO rating of 5 (Rouhotas 2010).

4.11.1.2 REGULATORY FRAMEWORK

STATE

California Fire Code and Guidelines

The 2007 California Fire Code (Title 24, Part 9 of the California Code of Regulations) establishes regulations to safeguard against hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises. The Fire Code also establishes requirements intended to provide safety and assistance to firefighters and emergency responders during emergency operations. The provisions of the Fire Code apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of every building or structure throughout the State of California (CBSC 2007). The Fire Code includes regulations regarding fire-resistance-rated construction, fire protection systems such as alarm and sprinkler systems, fire services features such as fire apparatus access roads, means of egress, fire safety during construction and demolition, and wildland-urban interface areas.

The County has adopted the California Fire Code with amendments specific to Imperial County. The following amendment applies to components of the proposed East Brawley Geothermal Development project:

Subsection 6 of Section 10032.2: An approved automatic fire sprinkler system shall be installed in every building where the gross floor area exceeds 3,000 square feet (sf).

California Health and Safety Code

Additional state fire regulations are set forth in Sections 13000 et seq. of the California Health and Safety Code, which include regulations for building standards, fire protection and notification systems, fire protection devices such as extinguishers and smoke alarms, and fire suppression training.

California Occupational Safety and Health Administration

In accordance with the California Code of Regulations, Title 8, Sections 1270, Fire Prevention, and 6773, Fire Protection and Fire Fighting Equipment, the California Occupational Safety and Health Administration (Cal/OSHA) has established minimum standards for fire suppression and emergency medical services. The standards include, but are not limited to, guidelines on the handling of highly combustible materials, fire hose sizing requirements, restrictions on the use of compressed air, access roads, and the testing, maintenance, and use of all firefighting and emergency medical equipment.

LOCAL

Imperial County Year 2006 Development Impact Fees Ordinance

In 2006, Imperial County adopted Ordinance 1418, which enacted County policies requiring new development in both the countywide and unincorporated areas of the county to supplement the fair share of the costs of public facilities, equipment, and services necessitated by such new development. The Imperial County Fire Department serves residential and nonresidential development in the unincorporated areas, providing fire protection and emergency medical services to residents and businesses. The ordinance assesses development impact fees based on demand for services. The fees are intended to finance development-related public facilities, which helps mitigate the impact of new development in the county. Development impact fees will be used to recover the cost of development-related facilities, but only to the extent that the need for facilities is a consequence of new development that is subject to the fees. This ensures that there is a reasonable relationship between the need for the facilities and the type of new development being assessed impact fees. Because the County provides some services on a countywide basis while others are provided only in unincorporated areas of the county, the fees are assessed based on demographics of unincorporated areas and incorporated cities. Specific fees are identified in Section 4.32.070 of the ordinance based on the service provided (e.g., sheriff, general government, fire, parks and recreation, public works, and library), location of the service (countywide or unincorporated), and type of development (residential or nonresidential).

Imperial County General Plan

The General Plan does not contain policies that relate to fire protection or emergency medical service issues pertinent to the proposed project.

Imperial County Office of Emergency Services – Emergency Operations Plan

The Imperial County Fire Department is the local Office of Emergency Services (OES) in Imperial County. The OES Coordinator is the County Fire Chief, who is assisted by an Assistant OES Coordinator who maintains the OES program for the County of Imperial. The department acts as the lead agency for the Imperial County Operational Area and provides leadership in all

4.11 PUBLIC SERVICES

phases of developing the emergency management organization, including public education, training, EOC operations, interagency coordination, and plan development (OES 2007).

The Imperial County Operational Area Emergency Operations Plan (EOP) provides a comprehensive, single source of guidance and procedures for the County to prepare for and respond to significant or catastrophic natural, environmental, or conflict-related risks that produce situations requiring coordinated response. It further provides guidance regarding management concepts relating to response and abatement of various emergency situations, identifies organizational structures and relationships, and describes responsibilities and functions necessary to protect life and property. The EOP is consistent with the requirements of the Standardized Emergency Management System (SEMS) as defined in Government Code Section 8607(a) and the U.S. Department of Homeland Security National Incident Management System (NIMS) for managing response to multi-agency and multi-jurisdictional emergencies. SEMS/NIMS incorporates the use of the Incident Command System, mutual aid, the operational area concept, and multi/interagency coordination (OES 2007).

Imperial County-Mexicali Emergency Response Plan

The Imperial County-Mexicali Emergency Response Plan is discussed in Section 4.7, Hazardous Materials/Public Health. While this plan covers emergencies, which would include fires, it is more focused on hazardous materials. Thus, these impacts are discussed in Section 4.7 of this DEIR.

4.11.1.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the California Environmental Quality Act (CEQA) Guidelines Appendix G thresholds of significance. The project would have a significant impact on fire protection and emergency medical services if it would:

- 1) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection.

METHODOLOGY

Evaluation of potential fire service impacts of the proposed project was based on letter consultation with the ICFD and review of the East Brawley Geothermal Development project plans. The proposed project was also reviewed for emergency medical services impacts.

IMPACTS AND MITIGATION MEASURES

Impacts to Emergency Response Access

Impact 4.11.1.1 Circulation and access to the site and surrounding parcels are not anticipated to be hindered during project construction or operation. Therefore, the project is not anticipated to affect emergency response times. This impact is considered **less than significant**.

The geothermal plant site, well testing, and pipeline construction areas are set back from the main roads surrounding the project site. Construction would occur in locations that do not have the potential to interfere with access to the project site or surrounding parcels. Adherence to standard safety regulations required as part of obtaining development permits would ensure that construction activities not disrupt on-site access for emergency vehicles and fire trucks. As a result, impacts to emergency response during construction would be less than significant.

The proposed project includes emergency access from Best Road into the south end of the property and the north side of Livesley Drain. The emergency access will be constructed with an all-weather surface and lead to a locked gate that can be opened by any emergency responders (Leiken 2009). Roads within the project site will be designed to conform to the 2007 California Fire Code (CFC), which requires a minimum width of 20 feet. Likewise, if gates are built to secure the fire apparatus access roads, they will be required to comply with 2007 CFC standards, which specify a minimum gate width of 20 feet, with the gate being a swinging or sliding type (Rodelo 2009). Thus, impacts to fire and emergency response associated with operation of the proposed project are considered **less than significant**.

Mitigation Measures

None required.

Increased Demand for Fire Protection Services

Impact 4.11.1.2 Implementation of the proposed East Brawley Geothermal Development project would result in an increase in demand for fire protection services over existing levels. However, the project design features include fire prevention and suppression features. Impacts to fire protection services are considered **less than significant with mitigation**.

The proposed project would result in an increase in demand for fire protection services over existing levels by introducing a geothermal power plant in a previously undeveloped portion of Imperial County. The Imperial County Fire Prevention Bureau reviewed the proposed project and provided feedback in a letter dated December 3, 2009 (Rodelo 2009). The project applicant responded detailing how the project would address the bureau's concerns. The proposed project includes features that would assist with fire prevention and suppression. All buildings will include approved automatic fire suppression systems. The only exceptions will be structures located at the well pads, as they are not occupied. A deluge sprinkler system will be installed that will activate when a vapor detector or flame detector is triggered. The diesel fire pump will have a flow rate of 2,000 gallons per minute (gpm) and a storage capacity that exceeds the requirements of the National Fire Protection Association (Leiken 2009). The project also includes a backup system consisting of a dry fire hydrant next to the fire water skid. (Note: A skid is a self-contained firefighting apparatus.) The dry fire hydrant and fire water skid are located near the cooling tower and the cooling tower pumps. If the diesel pumps fail, the fire department can connect to the dry hydrant and pump water through it. Dry hydrants are separated from the pressurized water source by a main valve in the lower section of the hydrant below ground. Every hydrant on the project site has a dedicated valve for the fire department tie-in. Protective pylons around water monitors will be designed to avoid obstructing outlets or valves.

The fire system at the plant will be based on water, as water is effective in suppressing fires of isopentane. Fire extinguishers and brass tools (sockets, hammers, and wrenches) will also be available on-site in the event of an isopentane fire. An Emergency Response Plan and a Risk

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Management Plan will be prepared identifying the types of incidents that may occur in association with the project. These plans will be prepared in coordination with the Imperial County Fire Department. In addition, drills and specialized training with regard to fire safety will be conducted with staff (Leiken 2009).

The Imperial County Fire Department has indicated that incidents requiring responses at the project site could create the need to backfill personnel into the responding agencies' jurisdictions. Response times to calls in the responding agencies' jurisdictions could be affected if staff were involved with an incident at the proposed project site. Likewise, the additional hazards created by a project of this nature and magnitude have the potential to burden the fire department such that additional personnel and equipment may be needed for certain response areas (Rouhotas, 2010). Thus, the proposed project could result in potentially significant impacts to demand for fire protection services.

Mitigation Measures

MM 4.11.1.2a The project applicant shall be required to pay a fair share contribution for additional fire facilities, equipment, and staff. Construction of such facilities and the structure(s) size, amount of equipment, and personnel required for these services shall be determined in consultation with the Imperial County Fire Department.

Timing/Implementation: Prior to the initiation of any site development or ground-breaking activities

Enforcement/Monitoring: Imperial County Fire Department; County of Imperial Planning and Development Services Department

MM 4.11.1.2b The Fire Impact Fees shall be imposed pursuant to Ordinance 1418 Section 2 (2006), which was drafted in accordance with the County's TischlerBise Impact Fee Study (TischlerBise 2006). The value of the impact fees for each proposed project shall be assessed using the formula derived in the study. Specifically, impact fees for nonresidential development shall be calculated on a per-employee basis. The Fire Impact Fees shall be calculated based on the cost of maintaining the County's current level of service to residential and nonresidential development. Fees collected shall only be used to mitigate the conditions created by the development, and such fees shall only be expended on facilities for which the fees were levied. This ensures that Fire Impact Fees will be used only to mitigate the impacts on fire service capabilities.

Timing/Implementation: Prior to the initiation of any site development or ground-breaking activities

Enforcement/Monitoring: Imperial County Fire Department; County of Imperial Planning and Development Services Department

Upon implementation of mitigation measures **MM 4.11.1.2a** and **MM 4.11.1.2b**, in addition to mitigation measures **MM 4.7.1a** and **MM 4.7.1b** (see Section 4.7, Hazardous Materials/Public

Health), impacts related to demand for fire protection services would be **less than significant with mitigation**.

4.11.1.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for fire protection is the service area of the Imperial County Fire Department, which includes residential and nonresidential development in the unincorporated areas of the county. The cumulative conditions for fire protection include existing, approved, proposed, and other development anticipated in the unincorporated county. Under cumulative conditions, the fire department would continue to provide fire protection services to Imperial County, including the project site. Currently, several projects are approved or under application with the County. In addition to the East Brawley Geothermal Development project, several projects are proposed in the vicinity of the project site. **Table 4.0-1** in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, provides a list of these projects.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Fire Protection Services

Impact 4.11.1.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase demand for fire and emergency medical services. This impact is considered **potentially cumulatively considerable**.

The proposed project would incrementally increase demand for fire protection services in unincorporated Imperial County. Moreover, the proposed project would result in placement of a geothermal plant in a portion of the county that was previously undeveloped. The County of Imperial Service Area Plan states that as development continues to occur, response times may increase due to the potential for simultaneous calls (OES 2007). Therefore, the proposed project's contribution to the demand for fire and emergency medical services would be **potentially cumulatively considerable**. The project applicant will be required to pay development impact fees in accordance with Ordinance 1418. In addition, the project applicant will be required to discuss possible contributions for additional fire equipment and staff with the Imperial County Fire Department (**MM 4.11.1.2a** and **MM 4.11.1.2b**) and a Hazardous Materials Business Plan (**MM 4.7.1a**) and an Emergency Response Plan (**MM 4.7.1b**). The project applicant will be required to pay for additional fire equipment, and staff, as determined appropriate by the Imperial County Fire Department (**MM 4.11.1.2a** and **MM 4.11.1.2b**).

The proposed project is also required to comply with the requirements of CFC 2007 and includes a variety of design features (automatic fire suppression system, deluge sprinkler system) to prevent and suppress fire.

Mitigation Measures

No additional mitigation is required. Implementation of mitigation measures **MM 4.7.1a**, **MM 4.7.1b**, **MM 4.11.1.2a** and **MM 4.11.1.2b** would ensure that potential cumulative impacts relating to fire and emergency medical services would be less than cumulatively considerable.

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Therefore, potential direct and indirect effects to fire protection and emergency medical services would be mitigated at the project level. The project would therefore not result in a cumulatively considerable demand on fire service resources in excess of those anticipated in the Imperial County Operational Area Emergency Operations Plan.

4.11.2 LAW ENFORCEMENT

4.11.2.1 EXISTING SETTING

The Imperial County Sheriff's Department is responsible for enforcement of state laws and County ordinances, operation of jail detention facilities, prevention of crime, and apprehension of criminals in unincorporated areas of Imperial County. The adult detention facilities include the County jail and minimum security facility. The proposed project would be located within the service area of the Imperial County Sheriff's Department.

Both the Sheriff's Office Headquarters and the two County correctional facilities are located approximately 2.5 miles southwest of the City of El Centro and about 3 miles west of the township of Heber, at 328 Applestill Road, El Centro. Sheriff substations are located in the communities of Brawley, Salton City, and Winterhaven, with resident deputies located in the unincorporated communities of Ocotillo, Bombay Beach, Niland, and Palo Verde. All other areas are patrolled by the main patrol division. Under an existing mutual aid agreement, additional law enforcement services would be provided if and when required by the City of Imperial and Brawley Police Departments. The Sheriff's Headquarters, located in the City of El Centro, would be the nearest service station to the proposed project site.

The average response time to the project site and countywide would be difficult to estimate, because of many factors such as size, available personnel, calls for service, workload, etc. Imperial County extends over 4,597 square miles, bordering Mexico to the south, Riverside County to the north, San Diego County to the west, and the State of Arizona to the east. The terrain varies from 235 feet below sea level at the Salton Sea to 4,548 feet above seat level at Blue Angel Peak. It would not be unusual to have a 60-minute response time in remote areas of the county, nor would it be uncommon to have a 5–10 minute response time in closer unincorporated areas of the county (Imperial County Sheriff's Department 2010).

The California Highway Patrol (CHP) provides traffic regulation enforcement, emergency accident management, and service and assistance on state roadways and other major roadways in the unincorporated portions of Imperial County. In the project vicinity, this includes Interstate 8, State Route (SR) 98, and SR 111 (Imperial County Sheriff's Department 2010).

4.11.2.2 REGULATORY FRAMEWORK

STATE

Emergency Response/Evacuation Plans

Government Code Section 8607(a) directs the Governor's Office of Emergency Services (OES) to prepare a Standard Emergency Management System (SEMS) program, which sets forth measures by which a jurisdiction should handle emergency disasters. The program is intended to provide effective management of multi-agency and multi-jurisdictional emergencies in California. SEMS consists of five organizational levels, which are activated as necessary: Field Response, Local Government, Operational Area, Regional, and State.

Local governments must use SEMS to be eligible for funding of their response-related personnel costs under state disaster assistance programs. The County of Imperial is generally responsible for emergencies that occur within the county and has adopted an Emergency Operations Plan that is consistent with the SEMS.

LOCAL

Imperial County Year 2006 Development Impact Fees Ordinance

In 2006, Imperial County adopted Ordinance 1418, which enacted County policies requiring new development in both the countywide and unincorporated areas of the county to supplement the fair share of the costs of public facilities, equipment, and services necessitated by such new development. The Imperial County Sheriff's Department provides service to residents and businesses in incorporated cities as well as in unincorporated areas. In addition, the Sheriff's Department operates the county jail and coroner's office, which are used by both incorporated and unincorporated areas of the county. The ordinance assesses development impact fees based on demand for services. The fees are intended to finance development-related public facilities, which helps mitigate the impacts of new development in the county. Development impact fees will be used to recover the cost of development-related facilities, but only to the extent that the need for facilities is a consequence of new development that is subject to the fees. This ensures that there is a reasonable relationship between the need for the facilities and the type of new development being assessed impact fees. Because the County provides some services on a countywide basis while others are provided only in unincorporated areas of the county, the fees are assessed based on demographics of unincorporated areas and incorporated cities. Specific fees are identified in Section 4.32.070 of the ordinance based on the service provided (e.g., sheriff, general government, fire, parks and recreation, public works, and library), location of the service (countywide or unincorporated), and type of development (residential or nonresidential).

Imperial County General Plan

The General Plan does not contain law enforcement policies that relate to the proposed project.

County Evacuation Plans

As previously discussed, the Imperial County Operational Area Emergency Operations Plan (EOP) provides guidance and procedures for the County to prepare for and respond to emergencies. The EOP designates the Sheriff's Department as having jurisdiction in an emergency involving evacuation within the unincorporated areas of the county and within contract cities (OES 2007).

4.11.2.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the State CEQA Guidelines Appendix G thresholds of significance. The project would have a significant impact to law enforcement services if it would:

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- 1) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for police protection.

METHODOLOGY

Evaluation of potential law enforcement impacts of the proposed project was based on consultation review of information compiled for previous projects in the county. The East Brawley Geothermal Development project plans were also reviewed for law enforcement and police protection services impacts.

PROJECT IMPACTS AND MITIGATION MEASURES

Impacts to Law Enforcement Response Time During Construction and Operation

Impact 4.11.2.1 Circulation and access to the site and surrounding parcels are not anticipated to be hindered during project construction and operation in a way that would affect law enforcement response times. This impact is considered **less than significant**.

The geothermal plant site, well testing, and pipeline construction areas are set back from the main roads surrounding the project site. Construction would occur in locations that do not have the potential to interfere with access to the project site or surrounding parcels. Adherence to standard safety regulations required as part of obtaining development permits would ensure that construction activities do not disrupt on-site access for law enforcement vehicles. As a result, impacts to law enforcement response time during construction would be less than significant.

The project includes an emergency access from Best Road into the south end of the property and the north side of Livesley Drain. The emergency access will be constructed with an all-weather surface and lead to a locked gate that can be opened by any emergency responders (Leiken 2009). Thus, impacts to law enforcement response time associated with operation of the project are considered **less than significant**.

Mitigation Measures

None required.

Increased Demand for Law Enforcement

Impact 4.11.2.2 Development of the proposed project would minimally increase the intensity of use on the project site, thereby increasing the chances of requiring police protection. This impact is considered **less than significant**.

The proposed project is a geothermal power plant that would employ a total of 25 people. The nature of activity and operations associated with a geothermal power plant do not require a high level of police services. For example, the proposed project would not include a large population and is not located in an area of high crime. The plant will be gated, and staff are on duty 24 hours and seven days a week.

The project includes lighting throughout the site for security and nighttime use of the proposed facilities. The power plant area will also be enclosed by a 6-foot-tall wire fence in an area approximately 900 by 600 feet, not including the substation or stormwater retention basin. These features would help deter and protect against theft and vandalism on the project site.

The low level of impacts anticipated from the proposed project on law enforcement will be mitigated to below a level of significance through the imposition of development impact fees to provide adequate law enforcement services. The development impact fees are assessed pursuant to Ordinance 1418. The County follows the requirement that fees collected can only be used to mitigate the conditions created by the development and that the fees can only be expended on facilities for which the fees were levied. This ensures that development impact fees will be used only to mitigate the impacts to Sheriff's Department service capabilities. This impact is considered **less than significant**.

Mitigation Measures

None required.

4.11.2.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for law enforcement would be the service area of the Imperial County Sheriff's Department, which includes incorporated cities and unincorporated areas. The cumulative conditions for police protection include existing, approved, proposed, and other development anticipated in the Imperial County General Plan and the service area for the Imperial County Sheriff's Department. Under cumulative conditions, the Sheriff's Department would continue to provide law enforcement services to Imperial County including the project site. The projected development in the county would increase both the resident population and the number of nonresidential structures requiring law enforcement protection. Currently, several projects are approved or under application with the County. In addition to the proposed East Brawley Geothermal Development project, several projects are proposed in the vicinity of the project site. **Table 4.0-1** in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, provides a list of these projects.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Law Enforcement Services

Impact 4.11.2.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase demand for law enforcement services. This impact is considered **less than cumulatively considerable**.

The proposed project would result in a slight incremental increase in demand for law enforcement services in unincorporated Imperial County. The project would result in placement of a geothermal plant in a portion of the county that was previously undeveloped. However, based on the nature of the project, demand for law enforcement would not dramatically increase. Overall increases in development in the county may result in increased demand for law enforcement services under cumulative conditions. The County of Imperial Service Area Plan states that as development continues to occur, response times may increase due to the potential for simultaneous calls. Therefore, the proposed project's contribution to the demand

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for law enforcement services would be potentially cumulatively considerable. However, the proposed project, as well as all other development occurring in the county, would be required to pay development impact fees in accordance with Ordinance 1418 for the Sheriff's Department. These fees would be used to supplement the fair share of the costs of equipment and services necessitated by each individual development project. Therefore, impacts would be mitigated on a project-by-project basis. Overall, the proposed project's contribution to law enforcement services would be mitigated to **less than cumulatively considerable**.

Mitigation Measures

None required.

4.11.3 SOLID WASTE

4.11.3.1 EXISTING SETTING

SOLID WASTE COLLECTION AND DISPOSAL

The proposed project site is located in the service area of Allied Waste Services. Currently, Allied Waste's service area includes the entire unincorporated area of the Imperial Valley as well as Borrego Springs. The cities of Calexico, Imperial, Holtville, and Brawley also have franchise agreements with Allied Waste (Araujo 2010).

Allied Waste has the ability to haul several types of waste including residential, commercial, and industrial. Allied Waste also hauls material for recycling. The recyclable materials are taken to the Materials Recycling Facility at 702 East Heil Avenue in El Centro, California. The Allied Imperial Landfill can also accept a limited amount of collection and demolition waste as well as wood products. Allied Waste hauls only nonhazardous waste with the exception of nonfriable asbestos (Araujo 2010).

There are eight active landfills in Imperial County. The Allied Imperial Landfill would receive waste from the proposed project. The landfill is located at 104 East Robinson Road in an unincorporated area of the county, east of the City of Imperial, approximately 10 miles south of the project site. The Allied Imperial Landfill currently has a permitted capacity of approximately 4,324,200 cubic yards. The permitted rate of disposal for the landfill is a maximum of 1,135 tons per day. The permitted area of the landfill is 170 acres, with a permitted disposal area of 73 acres (CalRecycle 2010a). The landfill is in the process of an expansion that will add 20 years of life to its existing two-year lifespan (Araujo 2010).

Permitted waste types at the Allied Imperial Landfill are Class III, nonhazardous, municipal waste, including agricultural, ash, construction/demolition, industrial, mixed municipal, and tires (CalRecycle 2010a).

DIVERSION RATE

Imperial County has the responsibility to develop plans and strategies to manage solid waste generated in its jurisdiction. The California Integrated Waste Management Act of 1989 (discussed further under Regulatory Framework below) requires that all jurisdictions divert 50 percent of total waste disposed of at Board-permitted landfills and transformation facilities through reduction, reuse, recycling programs, and composting programs. **Table 4.11.3-1** shows the diversion rates for the unincorporated areas of Imperial County from 1995 through 2000. According to CalRecycle (formerly the California Integrated Waste Management Board), the

waste diversion rates for more recent years cannot be accurately determined due to inaccurate base year data, a board approved base year that is later than the report year, or other issues. As shown, the county regularly exceeds the 50 percent diversion rate requirement (CalRecycle 2010b).

**TABLE 4.11.3-1
DIVERSION RATES UNINCORPORATED IMPERIAL COUNTY**

Reporting Year	Diversion Rate
1998	87%
1999	85%
2000 ¹	88%
2001 ¹	N/A
2002 ¹	N/A
2003 ¹	N/A
2004	75%
2005	22%
2006 ¹	N/A
2007 ¹	N/A
2008 ¹	N/A

Source: CalRecycle 2010b.

¹ A diversion rate cannot be accurately determined due to inaccurate base year data, a CalRecycle approved base year that is later than the report year, or other issues.

4.11.3.2 REGULATORY FRAMEWORK

STATE

California Integrated Waste Management Act of 1989

The California Integrated Waste Management Act of 1989 (AB 939) was signed into law by the Governor of California on September 29, 1989. Assembly Bill (AB) 939 requires each city and county in the State of California to divert 25 percent of its waste stream by 1995 and 50 percent by 2000 [Public Resources Code (PRC), Section 41780]. Each city and county in the State of California is required to manage waste disposal through the implementation of the Source Reduction and Recycling Element (SRRE). The SRRE was adopted in December 1993. Under the Source Reduction and Recycling Element, counties are required to demonstrate how they would achieve the mandated diversion goals through the implementation of diversion programs.

The diversion programs that the County of Imperial agreed to implement in order to meet these diversion goals are as follows:

- Agriculture Plastic
- Compost Operation

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- Procurement Policy
- Christmas Tree Diversion
- Commercial Source and Recycling
- Construction and Demolition
- School Recycling
- County Waste Reduction Policy

LOCAL

Imperial County General Plan

The General Plan does not contain policies that relate to solid waste issues associated with the proposed project.

Countywide Integrated Waste Management Plan for Imperial County

All California counties are required to prepare and submit to CalRecycle a Countywide Integrated Waste Management Plan (CIWMP), which includes all Source Reduction and Recycling Elements, all Household Hazardous Waste Elements, a Countywide Siting Element, all Nondisposal Facility Elements, all applicable regional SRREs, Household Hazardous Waste Elements, and an applicable Regional Siting Element if regional agencies have been formed. CalRecycle summarizes waste management problems facing the county and provides an overview of the actions that would be taken to achieve PRC Section 41780. Imperial County's CIWMP was approved by CIWMB (now CalRecycle) in May of 2000 (CIWMB 2008). The Executive Director of the CIWMB approved by Resolution 2008-91 the Five-Year Review Report of the Countywide Integrated Waste Management Plan for the County of Imperial on June 17, 2008.

4.11.3.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the State CEQA Guidelines Appendix G thresholds of significance. The project would have a significant impact on solid waste service if it would:

- 1) Be served by a landfill without sufficient permitted capacity to accommodate the project's solid waste disposal needs.
- 2) Be unable to comply with federal, state, and local statutes and regulations related to solid waste.

The Notice of Preparation prepared for the proposed project noted that solid wastes generated by the project would be handled in conformance with all applicable statutes and regulations. The potential for adverse effects from handling solid wastes generated by the project in noncompliance with applicable statutes and regulations is negligible. Therefore, the

handling of solid wastes issue is not discussed further. Additionally, for a discussion of hazardous wastes, refer to Section 4.7, Hazardous Materials/Public Health.

METHODOLOGY

Evaluation of potential solid waste impacts of the proposed project is based on the project's compliance with state solid waste regulations and the CEQA Guidelines. In addition, consultation with the local disposal company, the CalRecycle website, and review of current waste reduction programs and the Imperial County General Plan were considered in the evaluation.

Impacts to Landfill Capacity

Impact 4.11.3.1 Implementation of the proposed project would result in an increase in solid waste generation and the demand for waste disposal. Based on the nature of the project as a geothermal power plant, the proposed project is not anticipated to produce substantial amounts of solid waste that would adversely affect landfill capacity. Therefore, this impact is considered **less than significant**.

Most solid waste generated on the project site would occur during the construction phase of the geothermal plant. Mud and cuttings from drilling activities would be the primary sources of waste generated during construction. Drilling wastes would be temporarily stored in the on-site containment basin or tanks. The solid waste from the containment basins/mud pits are analyzed and discharged according to the resulting analyses to either a Class I or Class II landfill, or to a facility acceptable to the Regional Board Executive Officer. Should any other materials be generated during construction, they could be disposed of at the Allied Imperial Landfill or another landfill in the county that receives such construction waste. Thus, waste is not anticipated to be hauled to a landfill for disposal and impacts to landfill capacity during construction are considered less than significant.

During project operation, the amount of solid waste generated on the site is not anticipated to be substantial based on the nature of the project and the employment base. The project would be operated by 25 employees, which would produce a small amount of garbage each day. Operations of the plant itself would not generate large amounts of waste or garbage. It is anticipated that the project would implement a recycling program as appropriate in keeping with the provisions of the Countywide Integrated Waste Management Plan. The potential for the small amount of waste generated by the project to exceed the available landfill disposal capacity is negligible. Likewise, Allied Waste Services has indicated that the proposed project would have a less than significant impact on waste disposal services and landfill capacity (Araujo 2010). Therefore, this impact is considered **less than significant**.

Mitigation Measures

None required.

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4.11.3.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

Growth in the community increases the amount of waste generated and disposed. The cumulative setting for solid waste services would be the service area of Allied Waste, which includes the entire unincorporated area of the Imperial Valley and Borrego Springs. Under cumulative conditions, buildout anticipated under the Imperial County General Plan, as well as planned and proposed development, would result in additional solid waste generation. Under cumulative conditions, Imperial County would continue to see increased solid waste in all disposal facilities. The projected development in the county would include construction of additional industrial facilities and structures requiring solid waste disposal services.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Solid Waste Services

Impact 4.11.3.2 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase solid waste generation and demand for landfill capacity. However, Imperial County has implemented its Countywide Integrated Waste Management Plan, and adequate capacity is available at landfills that serve the county. Therefore, this impact is considered **less than cumulatively considerable**.

Cumulative development in Imperial County and the service area of Allied Waste would generate an additional demand on solid waste services. As described in the setting, as well as under Impact 4.12.3.1, the project is not anticipated to adversely impact landfill capacity. The Allied Imperial Landfill will be adding 20 years of capacity (Araujo 2010). Furthermore, seven other solid waste disposal sites in Imperial County are active and have remaining capacity. The County has also implemented a Countywide Integrated Waste Management Plan (CIWMP) to address source reduction across all sectors (residential, industrial, commercial). Therefore, the proposed project's contribution to cumulative demand for landfill capacity would be **less than cumulatively considerable**.

Mitigation Measures

None required.

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4.12 TRANSPORTATION AND CIRCULATION

4.12 TRANSPORTATION AND CIRCULATION

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) describes the potential transportation and circulation impacts associated with the proposed East Brawley Geothermal Development project. The information in this section is based on a traffic study prepared for the proposed project by Darnel and Associates (D&A 2009). The traffic analysis is included as **Appendix N** of this Draft EIR.

4.12.1 EXISTING SETTING

The proposed project is located in unincorporated Imperial County, north of the City of Brawley and east of the New River. The southern boundary of the project is located north of the City of Brawley within its sphere of influence and north of State Route (SR) 111. The Del Rio Country Club is south of the project site. The eastern boundary of the project is Dietrich Road, with Rutherford Road to the north. A majority of the project site is located along Best Road from Shank to Rutherford roads. An at-grade intersection has been built at the SR 111 bypass and Best Road, which will provide access to the project. An emergency access road is planned at the southeastern corner of the plant site at the intersection of Best Road and Ward Road. Well pads may be accessed from other County roads in the vicinity, such as Dietrich Road, Groshen Road, Rutherford Road, Ward Road, and Wills Road.

Based on the anticipated distribution of project traffic and discussions with County of Imperial Public Works Department staff (D&A 2009), the analysis contained in this section focuses on the following intersections and street segments. The analysis does not include freeway segments.

INTERSECTIONS

1. Best Road/Shank Road

STREET SEGMENTS

1. Best Road: North of Shank Road
2. Shank Road: West of Best Road
3. Shank Road: East of Best Road

EXISTING TRANSPORTATION NETWORK

The principal roadways in the project study area are briefly described below. **Figure 4.12-1** illustrates the project network system and existing transportation conditions.

Best Road is a north-south, two-lane roadway with 20–22 feet of pavement and graded shoulders. It has a classification of Local County Road.

Shank Road is an east-west, two-lane roadway that bisects Best Road approximately 1 mile south of the project site. West of Best Road, it has 20–22 feet of pavement and graded shoulders. To the east of Best Road, it is an unimproved gravel road with widths of 20 to 30 feet. This roadway is classified as a Local County Road.

4.12 TRANSPORTATION AND CIRCULATION

Airports

Table 4.12-1 lists the airports in the region and their distance from the proposed project.

**TABLE 4.12-1
AIRPORTS NEAR PROJECT SITE**

Airport Name	Distance from Project Site*	Direction from Project Site
Brawley Municipal Airport	1.3 mi.	South
O'Connell Brothers Airport	3.25 mi.	Southwest
Imperial County Airport	13.4 mi.	South-Southwest
Douthitt Strip	17.25 mi.	South
El Centro Naval Air Facility	15 mi.	Southwest
Holtville Airport	18.5 mi.	Southeast

Note: * Approximate distance

Source: Google Maps 2010

The two closest primary public use airports to the project site are the Brawley Municipal Airport and the Imperial County Airport. Brawley Municipal Airport is in the City of Brawley and located approximately 1.3 miles to the southwest of the proposed project; it is used for general aviation (AirNav, 2010). Imperial County Airport is located in the City of Imperial approximately 13.4 miles from the proposed project site. Imperial County Airport is primarily a general aviation facility, but is served by one commercial airline.

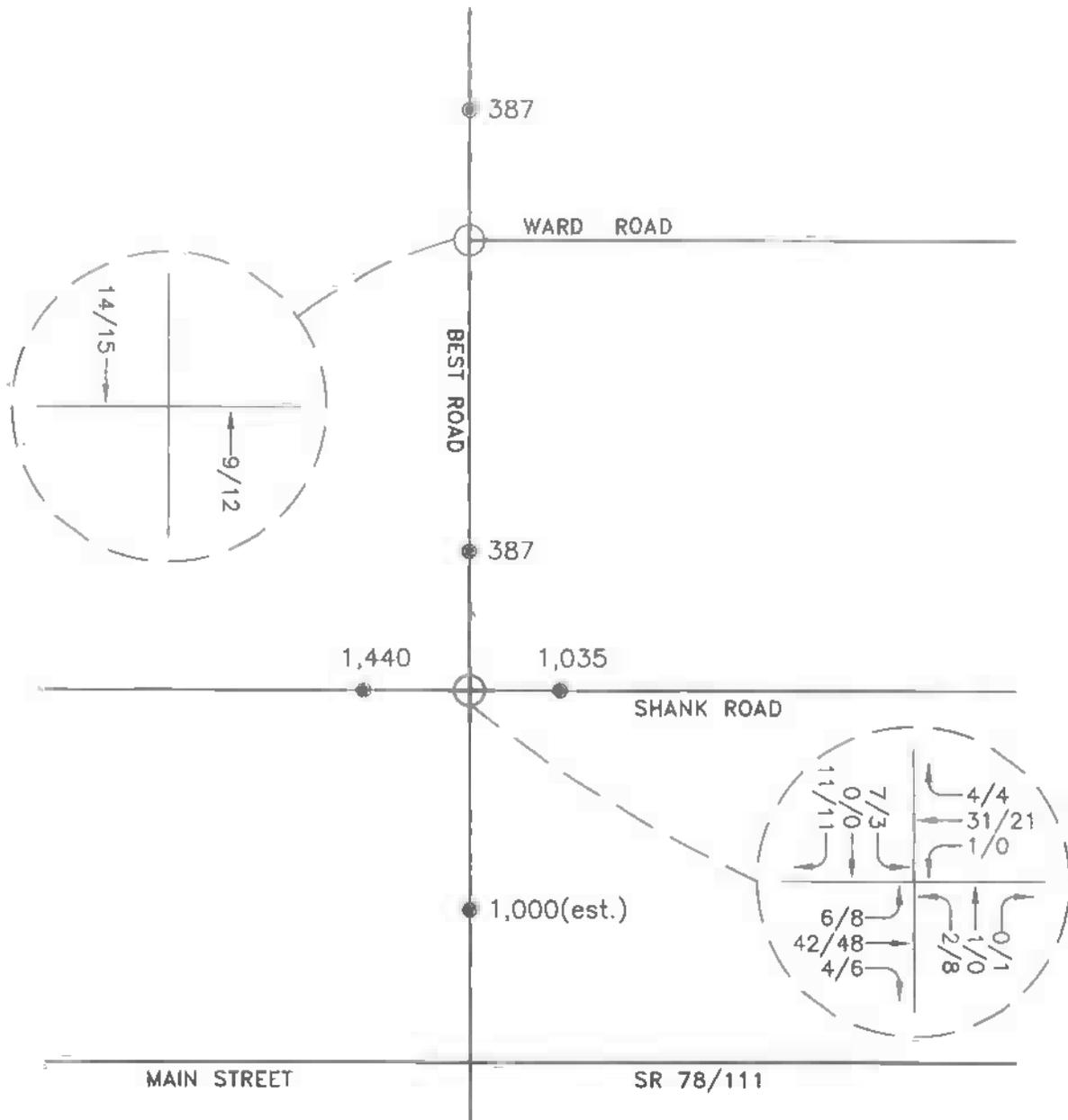
The proposed project is a geothermal power plant and associated pipeline infrastructure. The power plant facility would be located approximately 1.3 miles to the north of the Brawley Municipal Airport but due to the distance, scale, and nature of the geothermal plant, the project would not change air traffic patterns or result in an increase in air traffic. Additionally, the proposed project was review by the ALUC on September 17, 2008. The proposed project's consistency with the Brawley Municipal Airport was considered acceptable. Therefore, this issue will not be discussed further in this Draft EIR.

Railroads

The southwest- to northeast-trending tracks of the Union Pacific Railroad border the west side of the proposed power plant site and bisect the western side of the pipeline and well portion of the proposed project. There are no stops or passenger rail service within the project area. Although the project proposes geothermal pipes and on-site track crossings for service vehicles, the project applicants obtain all necessary permits from the California Public Utilities Commission (CPUC). Therefore, no transportation impacts related to railroads are anticipated, and this issue is not discussed further in this DEIR.

Transit Service

While Imperial Valley Transit provides inter-city fixed route bus system in Imperial County, no transit service is provided in the immediate vicinity of the project area.



- LEGEND**
- > — TRAVEL LANE
 - XX/YY — AM/PM TURN VOLUMES
 - Z,ZZZ — AVERAGE DAILY TRAFFIC
 - ▨ — PROJECT SITE

Source: Darnell & Associates, Inc. 2009



Figure 4.12-1
Project Network System



Bicycle and Pedestrian Facilities

No bicycle or pedestrian improvements have been made in the immediate project vicinity.

EXISTING TRAFFIC OPERATIONS

Level of Service Approach

Level of service (LOS) is the term used to denote the different operating conditions that occur on a given roadway segment or intersection under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis, taking into account factors such as roadway geometries, signal phasing, travel speed, travel delay, freedom to maneuver, and safety. LOS provides an index to the operational qualities of a roadway segment or an intersection. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. LOS designation is reported differently for unsignalized intersections, signalized intersections, street segments, and freeway mainline. The following describes the LOS designations for unsignalized intersections, street segments, and freeway mainline.

Street Segments

Street segment analysis is based upon the comparison of average daily traffic volumes with the County of Imperial criteria for daily traffic volumes (D&A 2009). **Table 4.12-2** shows the street segment analysis for existing roadway conditions currently operate at LOS A (D&A 2009).

Unsignalized Intersections

Unsignalized intersections were analyzed for the AM and PM peak hour conditions. The vehicle delay and levels of service were determined based upon the procedures found in Chapter 17 of the *2000 Highway Capacity Manual (HCM)*, using Synchro 6 intersection capacity software. The delay values (represented in seconds) were qualified with a corresponding intersection LOS. **Table 4.12-2** summarizes the delay thresholds for unsignalized intersections. Under the HCM methodology, LOS is based on the average stop delay per vehicle for all movements at all-way stop-controlled intersections. For one-way or two-way stop-controlled intersections, LOS is based on delay of the worst stop-controlled movement using the LOS ranges shown in **Table 4.12-2**. Intersection capacity analysis was conducted for intersections under existing conditions. As shown in **Table 4.12-3**, all of the intersections currently operate at LOS A (D&A 2009).

**TABLE 4.12-2
LEVEL OF SERVICE THRESHOLDS FOR UNSIGNALIZED INTERSECTIONS**

Average Control Delay per Vehicle (Seconds/Vehicle)			Level of Service
0.0	≤	10.0	A
10.1	to	15.0	B
15.1	to	25.0	C
25.1	to	35.0	D
35.1	to	50.0	E
	≥	50.1	F

4.12 TRANSPORTATION AND CIRCULATION

EXISTING TRAFFIC VOLUMES

Table 4.12-3 is a summary of existing average daily traffic (ADT) volumes and accompanying level of service (LOS) for the study roadway segments of the proposed project. These counts were taken on July 17, 2008. Figure 4.12-1 depicts the existing ADT traffic volumes.

**TABLE 4.12-3
EXISTING AVERAGE DAILY TRAFFIC (ADT) VOLUMES AND
LEVEL OF SERVICE (LOS) ON STUDY ROADWAY SEGMENTS**

Roadway Segment	ADT	LOS
Shank Road		
West of Best Road	1,440	A
East of Best Road	1,035	A
Best Road		
North of Shank Road	387	A

Source: D&A 2009

EXISTING INTERSECTION VOLUMES

Table 4.12-4 is a summary of existing AM/PM peak hour conditions at Best Road intersections with Shank Road and accompanying LOS. These counts were taken on July 17, 2008.

**TABLE 4.12-4
EXISTING INTERSECTION OPERATIONS**

Best Road/Shank Road Intersection	Peak Hour	Existing	
		Delay ¹	LOS ²
1. Northbound Best Road	AM	7.3	A
	PM	7.3	A
2. Southbound Best Road	AM	6.9	A
	PM	6.7	A
3. Eastbound Shank Road	AM	7.2	A
	PM	7.2	A
4. Westbound Shank Road	AM	7.1	A
	PM	7.0	A

Notes:

1 Minor street worst-case approach delay expressed in seconds per vehicle

2 Level of service

Source: D&A 2009

4.12.2 REGULATORY FRAMEWORK

STATE

State of California Traffic Impact Study Requirements

The California Department of Transportation (Caltrans) has established the following trip generation thresholds to determine when a traffic impact study is required:

- The proposed project generates over 100 peak hour trips assigned to a state highway facility.
- The proposed project generates 50 to 100 peak hour trips assigned to a state highway facility and affected state highway facilities are experiencing noticeable delay; approaching unstable traffic flow conditions (LOS C or D).
- The proposed project generates one to 49 peak hour trips assigned to a state highway facility and one of more of the following:
 1. Affected state highway facilities experiencing significant delay; unstable or forced traffic flow conditions (LOS E or F).
 2. The potential risk for a traffic incident is significantly increased (e.g., congestion related collisions, non-standard sight distance considerations, increase in traffic conflict points).
 3. Change in local circulation networks that impact a state highway facility (i.e., direct access to state highway facility, a non-standard highway geometric design, etc.).

The Caltrans traffic impact study guidelines do not establish an impact threshold of significance but does recommend the HCM methodology for analysis of traffic impacts.

REGIONAL

Southern California Association of Governments Regional Comprehensive Plan and Regional Transportation Plan

The Southern California Association of Governments (SCAG) Regional Comprehensive Plan is applicable to individual projects and is primarily used to encourage patterns of urban development and local land use that would relieve infrastructure costs and make better use of the existing facilities. The Regional Comprehensive Plan encourages development in and around activity centers, transportation corridors, underutilized infrastructure systems, and areas needing recycling and redevelopment.

The 2008 Regional Transportation Plan (RTP) provides long-range regional strategies that include new construction and improvements to the existing transportation system to enhance the movement of people and goods. It improves the quality of life in Southern California by planning for economic growth and by addressing air quality challenges with environmentally friendly strategies and technologies.

4.12 TRANSPORTATION AND CIRCULATION

LOCAL

County of Imperial General Plan

The General Plan Circulation and Scenic Highways Element, Land Use Element, and Conservation and Open Space Element policies related to the proposed project are identified below. **Table 4.12-5** summarizes the proposed project's consistency with the applicable General Plan policies.

While this DEIR analyzes the proposed project's consistency with the General Plan pursuant to California Environmental Quality Act (CEQA) Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

**TABLE 4.12-5
PROJECT CONSISTENCY WITH APPLICABLE GENERAL PLAN POLICIES**

General Plan Policies	Consistency with General Plan	Analysis
Circulation and Scenic Highways Element		
Policy: Distribute the costs of transportation improvements equitably among those who will benefit, including current roadway users.	Yes	The proposed project will include 20 feet of pavement for a left-turn lane from Best Road into the project plant. No other roadway improvements would be required.
Policy: Participate in the establishment of regional traffic mitigation fees to be assessed on new development. The fees shall cover a reasonable share of the costs of providing local and sub regional transportation improvements needed for serving new development in the unincorporated area.	Yes	The proposed project will include 20 feet of pavement for a left-turn lane from Best Road into the project plant. All improvements and rights-of-way dedications would be completed in accordance with County regulations. No other local or sub regional transportation improvements would be needed for this project.
Policy: Seek to work cooperatively with the Cities to require that development is their jurisdiction, also to contribute its fair share to County road improvements.	Yes	The proposed project will include 20 feet of pavement for a left-turn lane from Best Road into the project plant. No additional non-applicant-funded improvements would be required.
Roadway Improvement Policies		
Policy: It shall be the policy and direction under this circulation element that the dedication of rights of way and street improvements as a condition of issuance of a building permit and/or land use development application shall be required. All such rights of ways established in the functional road classifications shall be protected and procurement of needed rights of ways and improvements shall be made wherever possible. The County Planning and Development Services Director in conjunction with the County Road Commissioner shall review every building permit and land use development application in regards to obtaining the necessary right of ways and public improvements as a condition	Yes	The proposed project will include 20 feet of pavement for a left-turn lane from Best Road into the project plant. All improvements and rights-of-way dedications would be completed in accordance with County regulations. The proposed left-turn lane would not occur in a location that would incur significant impacts under CEQA. No other roadway improvements would be required.

4.12 TRANSPORTATION AND CIRCULATION

General Plan Policies	Consistency with General Plan	Analysis
of permit issuance. This shall also be performed during the CEQA review of any projects which fall under the CEQA Guidelines. All setbacks established by County Ordinance shall be deemed to commence from the edge of ultimate right of ways on any parcel or property fronting on a public street, right of way, or any other public transit corridor and not from the property line.		
Policy: The County shall assure that each addition to the circulation system is a functional link on the total system so that new routes and links are coordinated with existing routes to ensure that each new and existing roadway continues to function as it was intended.	Yes	The roadways included the proposed project are consistent with the County's established circulation system.
Policy: The County shall require or provide adequate traffic safety measures on all new and existing roadways. These measures may include, but not be limited to, appropriate levels of maintenance, proper street design, traffic control devices (signs, signals, and striping), street lighting, and coordination with the school districts to provide school crossing signs and protection.	Yes	The proposed project will be subject to review by the Imperial County Sheriff's Department, the Imperial County Fire Department, and other applicable agencies regarding adequate emergency access. The proposed site plan received preliminary approval from the Fire Department in 2009 indicating that the project includes adequate emergency access. Final review and approval will be required as part of site plan approval.
Policy: The County shall give priority to funding and implementing projects which either complete links on the circulation system, or relieve existing deficiencies.	Not applicable	The proposed project does not complete any missing links in the circulation system nor relieve existing deficiencies. Therefore no County funding is required.
Policy: Where feasible, the County shall interconnect traffic signals to form area networks or corridor systems. These systems shall be timed to facilitate the flow of through traffic on the arterial system, thus enhancing the movement of vehicles and goods through the County, while reducing fuel consumption and air pollution.	Not applicable	There are no existing or proposed signalized intersections in the vicinity of the proposed project.
Policy: The County shall impose appropriate pro-rated fees for construction of roadway facilities and associated landscaping to ensure that all new development contributes to the completion of the circulation system. In addition to pre-permit collection, such fees may be imposed through creation of assessment districts.	Yes	The proposed project will include 20 feet of pavement for a left-turn lane from Best Road into the project plant. All improvements and rights-of-way dedications would be completed in accordance with County regulations.
Policy: The County shall only approve and build streets as per County of Imperial Design Standards. Likewise, the County shall not allow impacts to other jurisdictions to be unmitigated, nor shall the County allow impacts created by projects within	Yes	All public streets improved by the proposed project would be consistent with County of Imperial Design Standards.

4.12 TRANSPORTATION AND CIRCULATION

General Plan Policies	Consistency with General Plan	Analysis
incorporated areas, to be unmitigated in the County.		
Policy: Require development to provide all necessary grading, installation of curbs, gutters, sidewalks, and parkway tree planting, unless these improvements are provided through other means.	Not applicable	The proposed project would not provide curb, gutters, or sidewalk to preserve the existing rural character of the project site.
Transportation Demand Policies		
Policy: The County shall encourage the reduction of vehicle miles, reduction of the total number of daily peak hour vehicular trips, and provide better utilization of the circulation system through development and implementation of Transportation Demand Management and Transportation Systems Management programs. These may include implementation of mandatory peak hour trip reduction, requirements for staggered work hours, telecommunications, increased development of employment centers where transit usage is highly viable, encouraging ride sharing in the public and private sector, provision for park and ride facilities adjacent to the regional transportation system, preparation of Traffic Management Plans and provision for transit subsidies.	Not applicable	The proposed project does not have any design elements that would conflict with adopted plans, policies, or programs that support non-motorized transportation or other alternatives modes of transportation. Additionally, the project's trip generation would not constitute impacts that would require Transportation Demand Programs.
Public Transit and Railway Improvement Policies		
Policy: The County shall require developers to construct, where appropriate, transit facilities, including bus pull-outs on arterials and collectors and bus stop amenities, including lighted shelters, benches, telephones, and route information signs.	Not applicable	There is no existing or planned transit service in the vicinity of the proposed project. Additionally, the proposed project's traffic contributions would not require such improvements to be included in the project plans.

4.12.3 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The impact analysis provided below is based on the following State CEQA Guidelines, as listed in Appendix G thresholds of significance. A project is considered to result in a significant impact if it would:

- 1) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.

- 2) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?
- 3) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?
- 4) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
- 5) Result in inadequate emergency access?
- 6) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

The County of Imperial's standards for determining significance (relative to the first threshold listed above) were used to assess the project's direct and cumulative impact on intersections, street segments, and freeway mainline. These standards focus on the project's direct impact on intersections and roadway segments compared to existing conditions. They also focus on the project's incremental impact on cumulative operations of intersections and roadway segments when other related proposed projects that could add traffic in the future are considered.

Direct Impacts

The County of Imperial has established LOS C or better as the acceptable level of service at intersections and roadway segments. In general, a location operating at LOS C or better under existing conditions that degrades to a LOS D or worse due to project traffic is considered a significant direct impact. A location operating at LOS D or E under existing conditions that degrades is considered a significant direct impact based on criteria identified in **Table 4.12-2**. If the intersection or roadway segment is currently operating at LOS F, the project would have a significant direct impact if it intersection delay by ten or more seconds or increases the roadway segment volume-to-capacity ratio by more than 0.09, respectively.

METHODOLOGY

The County of Imperial's standards for determining significance (relative to the first threshold listed above) were used to assess the project's direct and cumulative impact on intersections, street segments, and freeway mainline. These standards focus on the project's direct impact on intersections and roadway segments compared to existing conditions. They also focus on the project's incremental impact on cumulative operations of intersections and roadway segments when other related proposed projects that could add traffic in the future are considered.

To determine the proposed project's traffic impacts, the volumes presented in **Table 4.12-6** through **Table 4.12-10** were analyzed. The impacts of the project were analyzed using Highway Capacity Manual software for an all-way stop-controlled intersection analysis. The roadway segments volumes were analyzed using the County of Imperial LOS C capacities.

4.12 TRANSPORTATION AND CIRCULATION

Trip Generation, Distribution, and Assignment

Trip Generation – Project Operations

Trip generation of the proposed project has been estimated based on the number of employees on site, employees that arrive on site and then do periodic check of the well field, estimated weekly and monthly deliveries of supplies, gasoline, United Parcel Service/FedEx, chemicals, etc. The trip generation estimates were based on the North Brawley 1 project, which is located west of the proposed project. These estimates are provided in the appendices of the traffic report (**Appendix N**). As shown in **Table 4.12-6**, the proposed project is estimated to generate 84 daily trips. During the midday, well field employees will enter and leave the project site and traverse the well field for inspection service and repairs. The majority of these trips will take place on the private pipeline easement on private property. Deliveries, visitors, and vendors are expected to occur during the peak times of the day (D&A 2009).

**TABLE 4.12-6
PROJECT TRIP GENERATION**

	Daily	AM Peak Hour		PM Peak Hour	
		In	Out	In	Out
Employees ^(a)	51	17	0	0	17
Nightshift ^(a)	3	0	1	1	0
Well Field ^(a)	6	2	0	2	0
Subtotal	60	19	1	3	17
Deliveries/Visitors/Vendors ^(b)	24	0	0	0	0
Total	84	19	1	3	17

Notes:

(a) Three (3) trips per employee, assumes morning arrival, evening departure, and 2 trips per employee midday.

(b) Based on average of 10 deliveries per day, plus 2 vendors/visitors a day.

Source: D&A 2009

Trip Generation – Construction

Construction of the proposed project is estimated to take between 15 months. Construction of the plant is estimated to require 50 workers (which is a representative number for the average number of workers per day over the construction period) and generate 40 large trucks for materials delivery and up to 16 service vehicles. The project description states that there are 200 employees for construction, but this is for the life of the project for each phase: civil work, the mechanical team, the electrical team, and the cooling tower team. This construction activity will result in the following daily traffic being added to the street system:

Workers 50 x 2 = 100 ADT

Deliveries 40 x 2 = 80 ADT

Service Trucks 16 x 2 = 32 ADT

TOTAL 212 ADT

Trip Distribution and Assignment

Distribution of traffic to/from the site has been estimated based on employee trips and visitor/vender/delivery distributions. Employee distribution was based on the surrounding communities, and visitor/vender/delivery distribution was based on the available roadway system (SR 78/86, SR 111, and Best Road) and its connection to the City of Brawley. The distribution includes the use of SR 111 bypass that is presently under construction and planned for completion in 2010. **Figure 4.12-2** presents the anticipated distribution patterns and **Figure 4.12-3** presents resulting traffic volumes for the operations-related traffic. The project trip distribution and project traffic assumes that SR 111 will be open for traffic upon opening of the project.

Construction traffic was assigned to the roadways based on the trip distribution patterns presented in **Figure 4.12-2**. Project construction traffic is presented in **Figure 4.12-4** and was then added to existing traffic for analysis. The existing plus construction traffic is presented in **Figure 4.12-6**.

Emergency Access

Emergency access for the proposed project would be located at the southeastern corner of the plant site, at the intersection of Best Road and Ward Road. The proposed project, and all subsequent projects, would be subject to review by the Imperial County Sheriff's Department, the Imperial County Fire Department, and other applicable agencies regarding adequate emergency access. The proposed project was reviewed by the Fire Department in 2009 and received preliminary approval, indicating the plan provides adequate emergency access. However, the project will require final review and approval as part of final site plan approval. The County Planning and Development Services Department will coordinate with the Imperial County Fire Department to revise the site plan to ensure adequate emergency access in the final site plan, as needed. As such, the proposed project will comply with all applicable emergency access requirements and no impacts are anticipated. Therefore, this issue will not be discussed further in the DEIR.

Parking Capacity

The proposed project includes a parking area at the plant site that would comply with County parking regulations and be sufficient in providing adequate parking spaces for all traffic related to the proposed plant operations. Therefore, parking will not be discussed further in this DEIR.

Analysis of Scenarios

Project Operation-Generated Traffic

Intersection Operations

Table 4.12-7 shows that the Best Road and Shank Road intersection will operate at LOS A and the project access will operate at LOS A with and without the project. The future Best Road and SR 111 intersection was not analyzed. However, the low volume of project traffic will not cause any significant impact (D&A 2009).

4.12 TRANSPORTATION AND CIRCULATION

**TABLE 4.12-7
INTERSECTION IMPACT SUMMARY**

Intersection	Existing Conditions				Existing + Project Traffic				
	AM		PM		AM		PM		
	Delay Sec/Veh	LOS	Delay Sec/Veh	LOS	Delay Sec/Veh	LOS	Delay Sec/Veh	LOS	Significant Impact
Best Road/Shank Road									
Northbound Best Road	7.25	A	7.25	A	7.21	A	7.25	A	No
Southbound Best Road	6.87	A	6.72	A	6.89	A	7.04	A	No
Eastbound Shank Road	7.19	A	7.22	A	7.23	A	7.27	A	No
Westbound Shank Road	7.09	A	7.02	A	7.12	A	7.06	A	No
Best Road/Project Access									
Eastbound Best Road	N/A	N/A	N/A	N/A	8.4	A	8.5	A	No
Northbound Project Access	N/A	N/A	N/A	N/A	7.3	A	7.3	A	No

Street Segment Operations

Table 4.12-8 shows that Best Road and Shank Road roadways are presently operating at LOS A and with the addition of project traffic to the roads will continue to operate at LOS A (D&A 2009).

**TABLE 4.12-8
STREET SEGMENT IMPACT SUMMARY**

Roadway	Existing				Existing + Project Traffic		
	Classification	LOS C Capacity	Daily Traffic	LOS	Daily Traffic	LOS	Significant Impact
Shank Road							
West of Best Road	2LC	7,100	1,400	A	1,400	A	No
East of Best Road	2LC	7,100	1,035	A	1,035	A	No
Best Road							
North of Ward Road	2LC	7,100	387	A	409	A	No
North of Shank Road	2LC	7,100	387	A	567	A	No
South of Shank Road	2LC	7,100	1,000	A	1,180	A	No

Project-generated traffic volumes and distribution are shown in Figure 4.12-5.

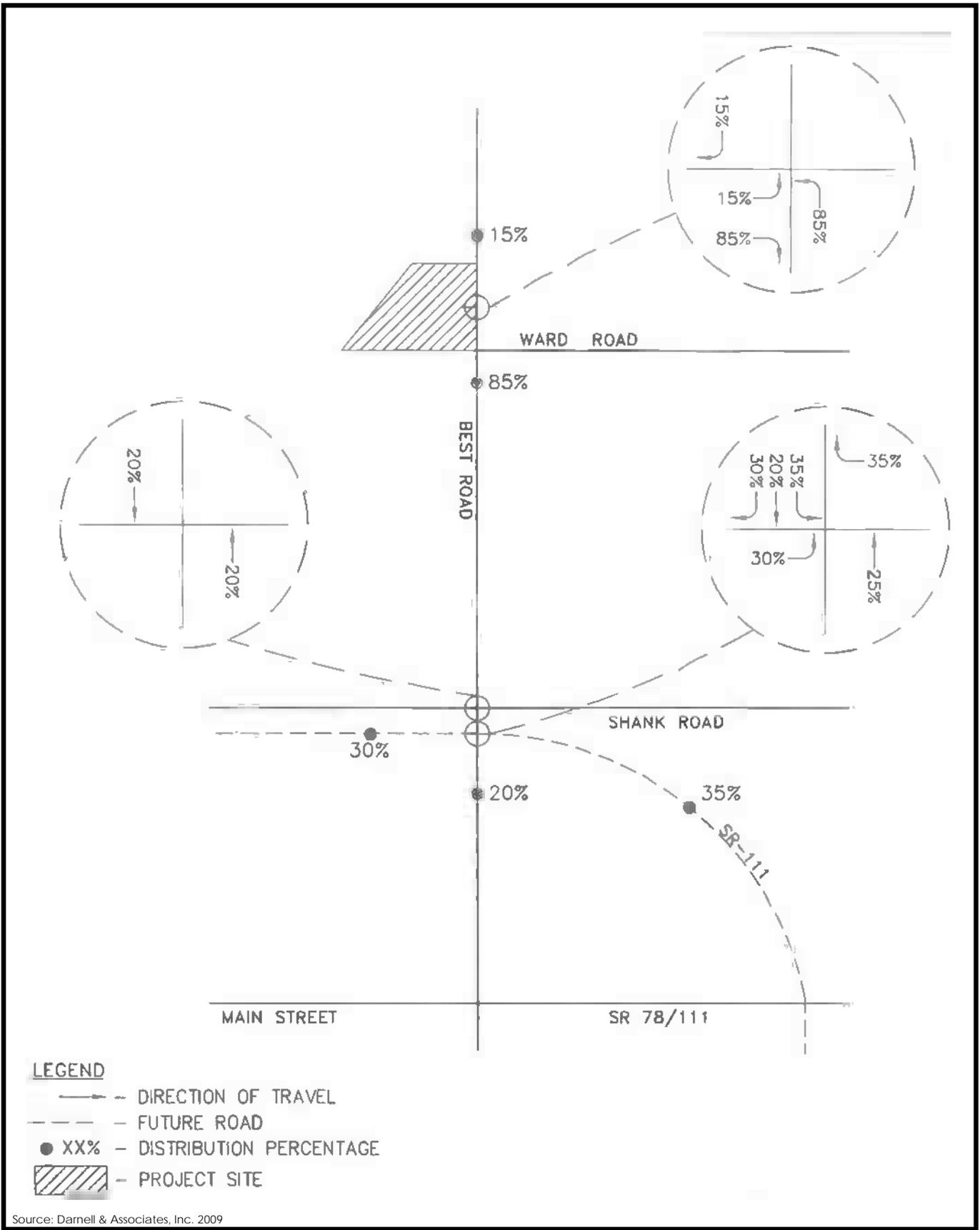
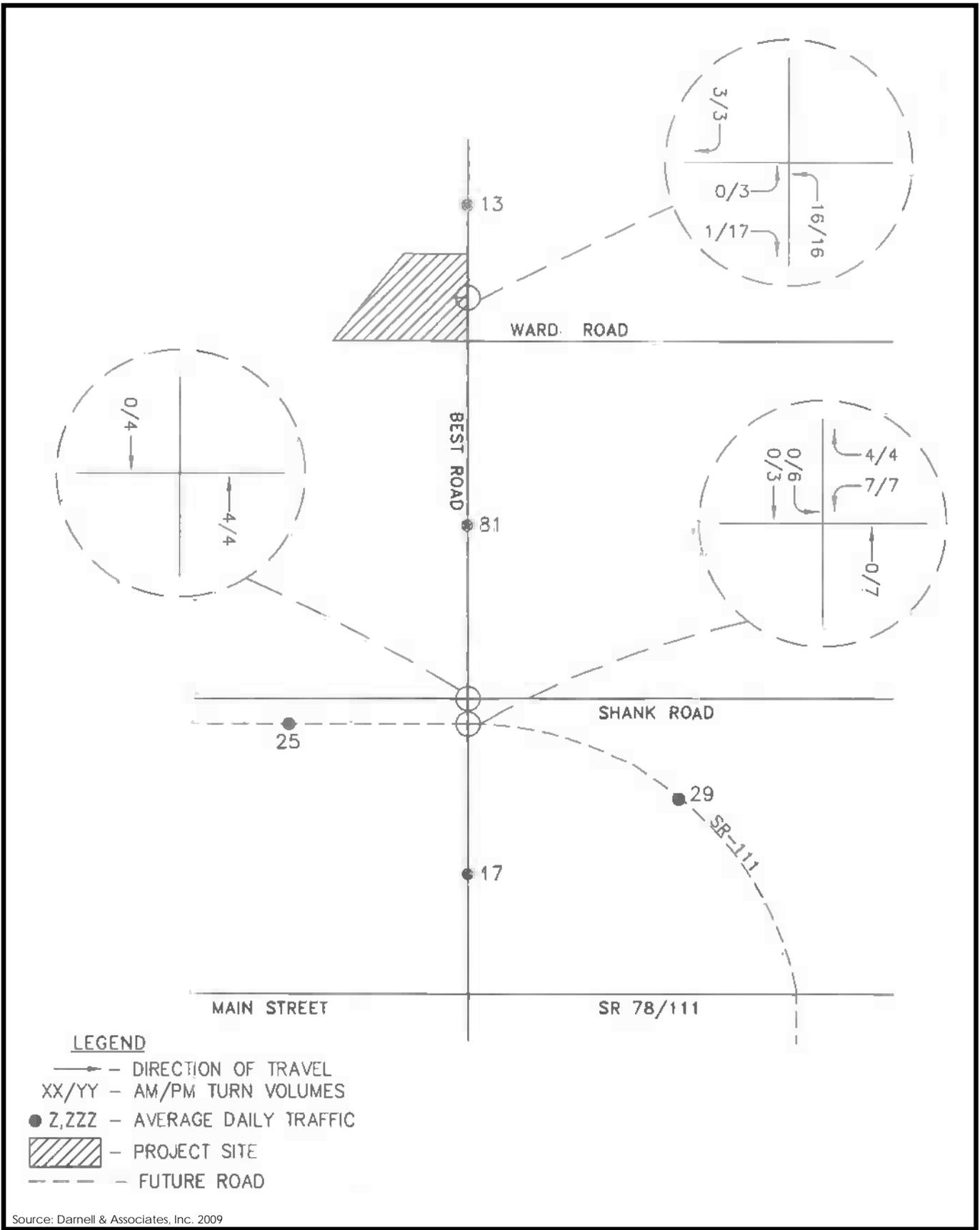


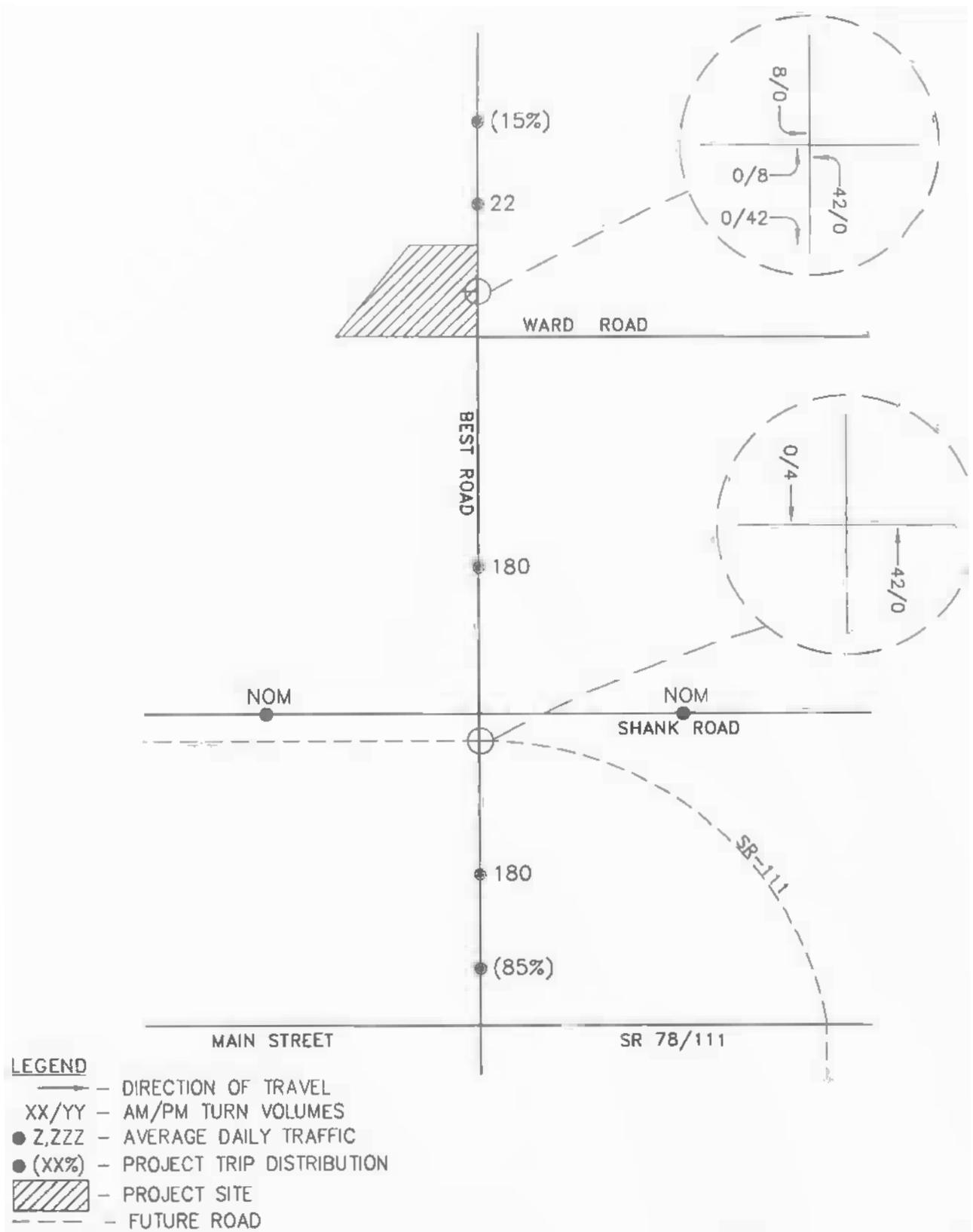
Figure 4.12-2
Project Distribution Patterns



Source: Darnell & Associates, Inc. 2009



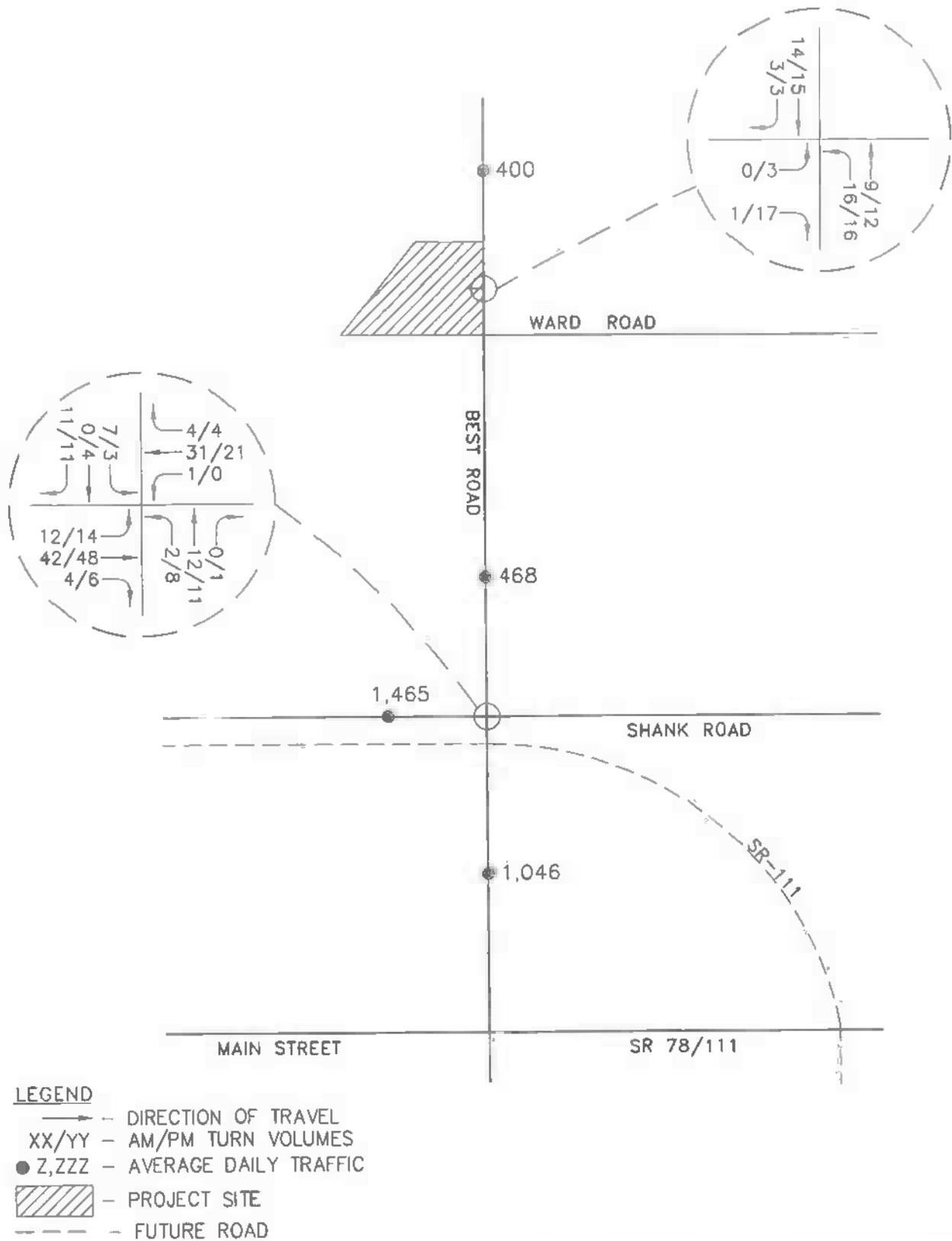
Figure 4.12-3
Project Traffic Volumes



Source: Darnell & Associates, Inc. 2009



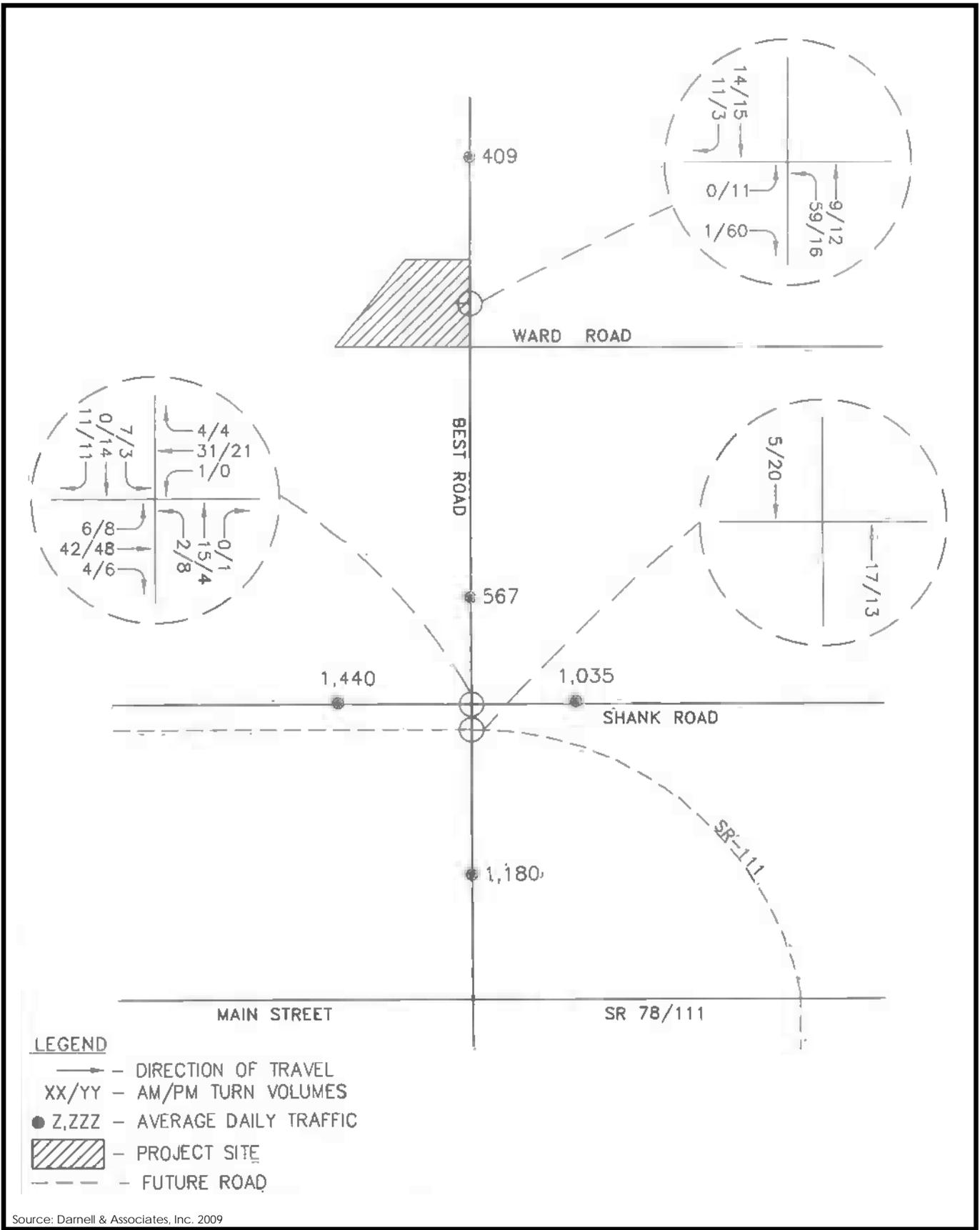
Figure 4.12-4
Construction Traffic Volumes



Source: Darnell & Associates, Inc. 2009



Figure 4.12-5
Existing plus Project Traffic Analysis



Source: Darnell & Associates, Inc. 2009



Figure 4.12-6
Existing plus Construction Traffic Analysis

Construction-Generated Traffic

Intersection Operations

Table 4.12-9 shows that the Best Road and Shank Road intersection will operate at LOS A and the project access will operate at LOS A with and without the construction-generated traffic. The future Best Road and SR 111 intersection was not analyzed. However, the low volume of project traffic would not cause any significant impact (D&A 2009).

**TABLE 4.12-9
CONSTRUCTION TRAFFIC INTERSECTION IMPACT SUMMARY**

Intersection	Existing Conditions				Existing + Construction Traffic				
	AM		PM		AM		PM		
	Delay Sec/Veh	LOS	Delay Sec/Veh	LOS	Delay Sec/Veh	LOS	Delay Sec/Veh	LOS	Significant Impact
Best Road/Shank Road									
Northbound Best Road	7.25	A	7.25	A	7.21	A	7.22	A	No
Southbound Best Road	6.87	A	6.72	A	6.89	A	7.00	A	No
Eastbound Shank Road	7.19	A	7.22	A	7.23	A	7.27	A	No
Westbound Shank Road	7.09	A	7.02	A	7.12	A	7.06	A	No
Best Road/Project Access									
Eastbound Best Road	N/A	N/A	N/A	N/A	8.3	A	8.4	A	No
Northbound Project Access	N/A	N/A	N/A	N/A	7.2	A	7.3	A	No

Street Segment Operations

Table 4.12-10 shows that Best Road and Shank Road roadways are presently operating at LOS A and with the addition of construction traffic to the roads will continue to operate at LOS A (D&A 2009).

**TABLE 4.12-10
CONSTRUCTION TRAFFIC STREET SEGMENT IMPACT SUMMARY**

Roadway	Existing				Existing + Construction Traffic		
	Classification	LOS C Capacity	Daily Traffic	LOS	Daily Traffic	LOS	Significant Impact
Shank Road							
West of Best Road	2LC	7,100	1,400	A	1,440	A	No
East of Best Road	2LC	7,100	1,035	A	1,395	A	No
Best Road							
North of Ward Road	2LC	7,100	387	A	409	A	No
North of Shank Road	2LC	7,100	387	A	567	A	No
South of Shank Road	2LC	7,100	1,000	A	1,180	A	No

4.12 TRANSPORTATION AND CIRCULATION

Project-generated traffic volumes and distribution are shown in **Figure 4.12-6**.

PROJECT IMPACTS AND MITIGATION MEASURES

Increase in Project Operations-Related Traffic

Impact 4.12.1 Buildout of the proposed project would result in increased project-related traffic volumes, which are not predicted to result in increased delays and deterioration in levels of service at area intersections and street segment operations. This is considered a **less than significant** impact.

As noted in **Table 4.12-7**, the Best Road and Shank Road intersection will operate at LOS A and the project access will operate at LOS A with and without the project. Though the future Best Road and SR 111 intersection was not analyzed, it is anticipated that the low volume of project traffic will not cause any significant impact. **Table 4.12-7** shows that Best Road and Shank Road roadways are presently operating at LOS A, and with the addition of project traffic, the roads will continue to operate at a LOS A. Buildout of the proposed project would not lead to a decrease in LOS for the project intersections and street segment operations (D&A 2009). Therefore, the proposed project's impact to traffic during operation is **less than significant**.

Mitigation Measures

None required.

Increase in Construction-Related Traffic

Impact 4.12.2 Buildout of the proposed project would result in increased construction-related traffic volumes, which are not expected to result in increased delays and deterioration in levels of service at area intersections and street segment operations. This is considered a **less than significant** impact.

The construction-related activities would produce an estimated 212 temporary ADT. **Tables 4.12-9** and **4.12-10** show that traffic associated with the construction of the proposed project would not lead to an increase in delays at area intersections (Best Road/Shank Road) or to the deterioration of street segment LOS (D&A 2009). Therefore, the proposed project's impact from construction-related traffic is **less than significant**.

Mitigation Measures

None required.

Substantially Increase Hazards Due to a Design Feature or Incompatible Uses

Impact 4.12.3 Buildout of the proposed project would not result in the construction of new access roads or traffic improvements, which could increase hazards. This is considered a **less than significant** impact.

Existing County roads and farm roads would be used to access the project site to the extent practical. Access roads developed for exploration would be used for any wells and pads that are used for development. No new public roads would be created. The proposed project will include 20 feet of pavement for a left-turn lane from Best Road into the project plant. All improvements and right-of-way dedications would be completed in accordance with County

standards. The proposed site plan received preliminary approval from the County Fire Department in 2009 indicating that adequate emergency access will be provided. The project will also be subject to review by the County Sheriff's Department and other applicable agencies regarding adequate emergency access. Final approval from these agencies will be required prior to final site plan approval. As such, the proposed project will not increase traffic hazards and this impact is considered to be **less than significant**.

Mitigation Measures

None required.

Conflict with Adopted Policies, Plans, or Programs Supporting Alternative Transportation

Impact 4.12.4 Buildout of the proposed project would result in the construction new private roads and improvements to existing roadways consistent with adopted policies, plans, and programs for alternative transportation. This is a **less than significant** impact.

Proposed improvements to Best Road are consistent with County standards for rights-of-way and road surface widths. Consistent with the existing conditions in the vicinity of the project site, no specific provisions are included for pedestrian or bicycle improvements in conjunction with the proposed project. The proposed project does not include any specific provisions for alternative transportation. The proposed project would not conflict with adopted plans, policies, or programs that support non-motorized transportation or other alternatives modes of transportation. As a result, the project is not expected to conflict with policies regarding alternative transportation. Any impacts are considered **less than significant**.

Mitigation Measures

None required.

4.12.4 Cumulative Setting, Impacts, and Mitigation Measures

CUMULATIVE SETTING

Cumulative Impacts

The County's thresholds of significance for a project's cumulative impacts incorporate traffic generated by other related proposed projects that could influence future traffic conditions in the study area. These criteria are summarized in **Table 4.12-11**. A cumulative impact can occur if the intersection or segment LOS is already operating below County standards and the project traffic increases the intersection delay by more than two seconds or the roadway segment volume-to-capacity (V/C) ratio by more than 0.02.

4.12 TRANSPORTATION AND CIRCULATION

**TABLE 4.12-11
SIGNIFICANCE CRITERIA**

Existing	Existing + Project	Existing + Project + Cumulative Projects	Impact Type
Intersections			
LOS C or better	LOS C or better	LOS C or better	None
LOS C or better	LOS C or better and project adds < 2.0 seconds of delay	LOS D or worse	None
LOS C or better	LOS C or better and project adds > 2.0 seconds of delay	LOS D or worse	Cumulative
LOS C or better	LOS D or worse	LOS D or worse	Direct
LOS D	LOS D and project adds < 2.0 seconds of delay	LOS D or worse	None
LOS D	LOS D and project adds > 2.0 seconds of delay	LOS D or worse	Cumulative
LOS D	LOS E or F	LOS E or F	Direct
LOS E	LOS E and project adds < 2.0 seconds of delay	LOS E or F	None
LOS E	LOS E and project adds > 2.0 seconds of delay	LOS E or F	Cumulative
LOS E	LOS F	LOS F	Direct
LOS F	Project add < 2.0 seconds of delay	LOS F	None
LOS F	Project adds 2.0 to 9.9 seconds of delay	LOS F	Cumulative
LOS F	Project adds 10.0 or more seconds of delay	LOS F	Direct
Segments			
LOS C or better	LOS C or better	LOS C or better	None
LOS C or better	LOS or better and project increases V/C by < 0.02	LOS D or worse	None
LOS C or better	LOS C or better and project increase V/C by > 0.02	LOS D or worse	Cumulative
LOS C or better	LOS D or worse	LOS D or worse	Direct ¹
LOS D	LOS D and project increases V/C by < 0.02	LOS D or worse	None
LOS D	LOS D and project increases V/C by > 0.02	LOS D or worse	Cumulative
LOS D	LOS E or F	LOS E or F	Direct
LOS E	LOS E and project increases V/C by < 0.02	LOS E or F	None
LOS E	LOS E and project increases V/C by > 0.02	LOS E or F	Cumulative
LOS E	LOS F	LOS F	Direct
LOS F	Project increases V/C by < 0.02	LOS F	None
LOS F	Project increases V/C by > 0.02 and < 0.09	LOS F	Cumulative
LOS F	Project increases V/C by > 0.09	LOS F	Direct

Notes:

LOS = level of service

V/C = volume-to-capacity ratio

¹ Exception: If Existing + Project segment operation is LOS D and intersections along segment are LOS D or better, then there is no significant impact

If an intersection or roadway segment operates at LOS C or better under existing conditions and the proposed project adds a small amount of traffic resulting in an increase of two seconds or less in intersection delay or roadway segment V/C increase of 0.02 or less, the project is not considered to have a significant impact even if the addition of cumulative traffic causes the LOS to degrade to a poor LOS (i.e., in CEQA terms, the project's contribution is not deemed to be "cumulatively considerable").

It is important to note that, due to lack of a congestion management agency or applicable congestion management program for Imperial County, threshold of significance 2 above is not applicable for this Draft EIR and is not evaluated further.

There are other planned projects within the County of Imperial that could add traffic to the roadways surrounding the project site under cumulative conditions (see **Table 4.0-1**). It is assumed that the projects included in the cumulative analysis will conduct project-specific traffic studies that implement mitigation measures to reduce individual impacts to levels below significant levels.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Transportation and Circulation

Impact 4.12.5 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in increased traffic volumes that are not expected to result in increased delays or deterioration of levels of service at area intersections or roadway segments. This impact is considered to be **less than cumulatively considerable**.

As noted in **Table 4.12-6**, buildout of the proposed project would result in 84 ADT, which would not lead to a decrease in LOS for the project intersections and street segment operations (D&A 2009). Therefore, due to the minimal number of ADT for the proposed project and the lack of additional cumulative projects in the area (refer to **Figure 4.0-1**), the project, in combination with other proposed and approved cumulative projects in the vicinity, under the cumulative condition would result in a **less than cumulatively considerable** impact.

Mitigation Measures

None required.

4.12 TRANSPORTATION AND CIRCULATION

REFERENCES

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Google Maps. 2010. <http://maps.google.com/> (accessed August 9, 2010).

4.13 UTILITIES

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) describes the existing utility and service systems in the vicinity of the project site and identifies the potential physical environmental impacts that would result from provision of services to the proposed East Brawley Geothermal Development project. This evaluation also provides appropriate mitigation measures, when feasible, to reduce impacts that would result from the provision of water, wastewater, and electricity, natural gas, and telephone services. The information in this section is based on information provided in the Conditional Use Permit (CUP) application for the proposed project (**Appendix B**) and the water supply assessment prepared for the proposed project by Development Design & Engineering, Inc. (**Appendix K**), as well as information obtained from service providers.

The reader is referred to Section 4.8, Hydrology and Water Quality, for a discussion of stormwater drainage and to Section 4.11, Public Services, for a discussion of solid waste.

4.13.1 WATER SUPPLY

4.13.1.1 EXISTING SETTING

IMPERIAL IRRIGATION DISTRICT

Established in 1911, the Imperial Irrigation District (IID) is a community-owned utility that provides irrigation water and electric power to the lower southeastern portion of California's desert. IID serves as a regional water supplier by importing raw Colorado River water and delivering it to agricultural, municipal, and industrial water users within its service area (DDE 2010).

The project site is currently used for agricultural production and is irrigated with water purchased from IID via the Best, Moorhead, Oakley, Rockwood, and Spruce canals (DDE 2010).

Water Supply

IID relies solely on surface water supplies from the Colorado River. IID's entitlement of Colorado River water consists of 3.1 million acre-feet per year (AFY) according to the 2003 Quantification Settlement Agreement (QSA), which is described in the Regulatory Setting section below (DDE 2010).

Water Use and Demand

Demand for water in IID's service area is divided into three basic categories: agricultural, municipal, and industrial. In 2008, IID delivered 2,543,642 AFY of water to its customers. Of this amount, 2,489,196 acre-feet, or 97.85 percent, were to agricultural users. The seven incorporated and three unincorporated urban areas within IID's service area each divert water from IID's canal system to their treatment facilities prior to individual water user distribution within their respective municipal areas. The primary industrial water users outside the urban areas are geothermal plants, Holly Sugar Corporation, chemical and fertilizer producers, a state prison, and a U.S. Naval Air Facility (DDE 2010).

IID is a raw water retailer and a domestic raw water wholesaler and does not supply potable drinking water. In addition to supplying large agricultural operations with raw water, IID provides raw water to small acreage and service pipe connections, some of which are rural homes without an alternative water source. In these instances, IID has complied with state and federal Safe Drinking Water Acts through an exclusionary process unique to irrigation districts. IID ensures

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that all rural water users (with indoor uses of canal water) also have a source of water delivered to their property for cooking and drinking purposes from a California Department of Health Services approved provider (DDE 2010).

Unaccounted Water

IID's delivered water values are operational summaries of users that may include agricultural, small acreage, municipal, industrial, and some losses. Additional water not accounted for in these numbers may include unmeasured deliveries such as service pipes, temporary construction, and miscellaneous uses as well as operational and system losses. There is no available data from one source that completely distinguishes between these uses of raw water. Water distribution systems lose water during distribution for several reasons. Specific water distribution losses depend on the type of distribution system. A piped water distribution system can lose water due to pipe failures or leaks. Open channels, ponds, reservoirs, and water basins can lose water from seepage through the soil, surface evaporation into the air, and plant consumption. IID has an open channel gravity flow water distribution system comprising over 1,600 miles of laterals and main canals. Its water distribution system losses result from four major conditions: seepage, operational discharges, evaporation, and phreatophyte consumption (DDE 2010).

Supply/Demand Comparison

Historical

Table 4.13-1 below summarizes IID's water supply and consumption and resulting overruns and underuses between 2003 and 2009. Since implementation of the QSA in 2003, IID has exceeded its entitlement of 3.1 million acre-feet per year in 2003, 2006, and 2007.

**TABLE 4.13-1
IID SUPPLY AND USE – 2003 TO 2009 (ACRE-FEET AT IMPERIAL DAM)**

	2003	2004	2005	2006	2007	2008*	2009**
Entitlement	3,100,000	3,100,000	3,100,000	3,100,000	3,100,000	3,100,000	3,100,00
USBR Decree Accounting Report Overrun	6,886			18,914	6,358		
Estimated Underuse***		±165,000	±160,000			±49,000	±237,767

Source: DDE 2010

Notes: *IID draft 2008 Consumptive Use values at Imperial Dam.

**Data in 2009 column is a mixture of information from the Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement for purposes of Section 5(B) of Interim Surplus Guidelines – Exhibit B Quantification and Transfers, and IID September 2010 Pocket Information.

***Estimated, no formal accounting for exact values in 'underrun' years.

Future

Table 4.13-2 shows the projected population of Imperial County and associated water demands in five-year increments from 2010 to 2030. In 2010, the population is estimated to be 182,737 people with a projected water consumption of 51,173 acre-feet per year. In 2030, the population is estimated to be 263,497 with a water consumption of 73,789 AFY.

Municipal water use accounts for less than 3 percent of all Colorado River water used in the IID service area, whereas agricultural use accounts for approximately 97 percent. Municipal water consumption in the IID service area is minor when compared to total consumptive use. In addition, municipal water users have the highest priority for supply apportionment. For these reasons, adequate water supply is available to service the growing population through 2030.

TABLE 4.13-2
WATER DEMAND BASED ON PROJECTED POPULATION*

Year	Projected Population	Projected Water Demand	
		Gallons per Year**	Acre-Feet per Year***
2010	182,737	16,674,751,250	51,173
2015	202,927	18,517,088,750	56,827
2020	223,117	20,359,426,250	62,481
2025	243,307	22,201,763,750	68,135
2030	263,497	24,044,101,250	73,789

Source: DDE 2010

Notes: *Water consumption levels are only for residential.

**Gallons were based on 250 gallons per person per day multiplied by 365 days per year.

***1 acre-foot = approximately 325,851 gallons

Table 4.13-3 summarizes the projected water consumption by current users for the Imperial Valley from 2010 through 2030.

TABLE 4.13-3
PROJECTED IID SERVICE AREA WATER CONSUMPTION, 2010–2030 (ACRE-FEET AT IMPERIAL DAM)

Year	IID Net Consumptive Use Amount	Total County Consumption*	Beyond Projected Use**
2010	3,100,000	2,738,800	0
2015	3,100,000	2,569,800	0
2020	3,100,000	2,649,800	0
2025	3,100,000	2,617,800	0
2030	3,100,000	2,612,800	0

Source: DDE 2010

Notes: *Based on IID QSA CRWDA obligation to reduce consumptive use in each year.

**Beyond Projected Use for each year was calculated by subtracting the total county consumption from IID's Net Consumptive Use Amount, based on CRWDA Exhibit B, adjusted for updated IID/MWD Agreement for transfer of 105,000 acre-feet per year.

Expected Water Availability During Single and Multiple Dry Years

The single and multiple dry years of the Imperial Valley were determined based on IID's historical consumptive use of Colorado River water since implementation of the QSA in 2003. As shown in Table 4.13-1, during this period, overruns occurred in 2003, 2006 and 2007. The largest overrun was in 2006, at 18,914 acre-feet.

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TABLE 4.13-4
SINGLE AND MULTIPLE DRY WATER YEARS, IMPERIAL VALLEY

	Single Dry Year	Multiple Dry Years		
	2006	2003	2006	2007
Overrun (acre-feet)	18,914	6,886	18,914	6,358

Source: DDE 2010

Supply Management during Supply Demand Imbalance

A Supply Demand Imbalance (SDI) is triggered whenever the probability of exceeding IID's 3.1 million acre-foot cap is greater than 50 percent. This determination is made on an annual basis by IID's Board of Directors and may be terminated if IID's cumulative consumptive use through June is less than 1,575,000 acre-feet (IID 2010).

Equitable Distribution Plan

On November 28, 2006, the IID Board of Directors approved the development of an equitable distribution plan to apportion agricultural water users using the straight-line method for years that conditions trigger an SDI declaration. There are two purposes served in declaring a SDI and imposing a system of equitable distribution in a given water year. The first is to manage the resource among all classes of water users to avoid exceeding the district's annual entitlement; the second is to avoid the creation of any unused entitlement water at the end of the year that would flow to a junior rights holder.

Under the Equitable Distribution Plan (EDP), all municipal and industrial water users are given preferred status, meaning that their needs have been assigned a higher priority than those of agricultural water users. Municipal and industrial users are afforded their respective historical usage. In the event that this quantified amount is exceeded, a fee is imposed to recover the cost of the resulting overrun (IID 2010).

Water Conservation

To help reduce the probability of an SDI occurring, IID has been working on and continues to work on water conservation measures. IID adopted a Water Conservation Plan in 2007 consisting of various conservation measures that are classified as follows:

- IID Water Conservation Programs and Projects
- IID/MWD Conservation Programs and Projects
- IID QSA Programs and Projects

In addition, IID is subject to further water conservation measures contained in the Draft Integrated Water Resources Management Plan (IWRMP). These measures are classified as follows:

- Agricultural Water Use Efficiency and Conservation
- Urban Water Use Efficiency/Conservation
- Renewable Energy Production Water Conservation (IID 2010)

Infrastructure

The Imperial Dam is located 20 miles northeast of Yuma, Arizona, and serves as IID's point of diversion from the Colorado River to the All-American Canal. The All-American Canal is an 82-mile-long gravity flow canal that services the Imperial Valley via three main canals: East Highline, Central Main, and Westside Main. Through 1,668 miles of canals and laterals, IID is able to deliver water throughout its service area (DDE 2010).

IID's open channel gravity flow irrigation and drainage system services over 500,000 acres of irrigated farmland. The system includes 80 miles of the All-American Canal, 52 miles of drains in the All-American Canal Section, 3 miles of the New Briar Canal, and 1,620 miles of other main and lateral canals. As of 2005, there were 1,668 miles of IID canals, which include the All-American Canal, mains, and laterals. Also as of 2005, there were 1,456 miles of IID drains. The number of pipe-lined canals is increasing for projects within or adjacent to urban areas due to real estate development that is occurring in the Imperial Valley (DDE 2010).

CITY OF BRAWLEY WASTEWATER TREATMENT PLANT

The Brawley Wastewater Treatment Plant (WWTP) is located west of the project site. The plant's design capacity is 5.9 million gallons per day, and it operated at 3.9 million gallons per day average daily flow in 2008. The plant does not currently provide tertiary treatment and none of the treated wastewater is reclaimed for other uses (City of Brawley 2010; Ormat 2010).

GROUNDWATER

Groundwater in the IID service area is of poor quality and is unsuitable for domestic or irrigation use. Total dissolved solids (TDS) range from hundreds to more than 10,000 milligrams per liter (mg/L). Generally, the groundwater's fluoride concentration is higher than recommended for drinking water, while its boron concentration exceeds that recommended for certain agricultural crops. The reader is referred to Section 4.8, Hydrology and Water Quality, of this DEIR for further discussion of groundwater resources and quality.

4.13.1.2 REGULATORY FRAMEWORK

FEDERAL

2003 Quantification Settlement Agreement

As urban Southern California began outgrowing its existing apportionments of Colorado River water, many began to look to IID and its large water right as a potential source of water supply. In 1988, IID entered into a long-term conserved water transfer with the Metropolitan Water District of Southern California for 105,000 AFY. In 1998, IID entered into another conserved water transfer agreement with the San Diego County Water Authority for 200,000 to 300,000 AFY. Additional interest in transfer agreements with IID resulted in all major Southern California water agencies, along with the United States and the State of California, negotiating to try and reach settlement, termed the Quantification Settlement Agreement, by the end of 2002.

However, as the end of 2002 approached, a settlement acceptable to all parties was not found. On December 27, 2002, the U.S. Department of the Interior issued a letter to IID warning that if IID agreed to the QSA by the end of 2002, IID's water order of 3.1 million acre-feet per year would

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be honored; however, if IID did not agree, then the Department of the Interior would cut IID's 2003 water supply by about 270,000 acre-feet.

IID filed a federal lawsuit against the United States and various officers thereof in January 2003 and obtained a preliminary injunction against the reduction in IID's 2003 water supply. The Superior Court of California, however, granted the United States leave to conduct further review of IID's water use. Pursuant to that review, on August 29, 2003, the Bureau of Reclamation's Lower Colorado Regional Director issued a Final Determination and Recommendations (Part 417 Determination), which remained subject to appeal to the Secretary of the Interior and then judicial review. In the Part 417 Determination, the Regional Director, Robert W. Johnson, determined that IID's 2003 3.1 million acre-feet water order should be denied and IID should be allowed to divert only 2,835,500 acre-feet.

The IID, the United States, the State of California, the other California water agencies, and other basin states were on the brink of years of complex litigation over the Part 417 Determination and other disputed issues. All agencies believed that a consensual resolution was preferable to the risks of litigation. After thousands of hours of further negotiations, which involved Congressional leaders, state legislators, and senior executives of the United States and California, as well as many water agencies and environmental groups, consensus was finally reached. The QSA and related agreements were agreed to by all. On October 2, 2003, IID's Board of Directors authorized the signing of the QSA and related agreements after appropriate review and approval of environmental assessments and notice to the public.

The general impact of the QSA and related agreements as to IID can be described as follows: IID has agreed to 35 to 75 years of large-scale water conservation in which millions of acre-feet of conserved water will be transferred to urban southern California and a cap on IID's Priority 3 and a Priority 6 reprioritization with specific volumes. Along with such a conservation and cap, large-scale environmental mitigation will be implemented throughout the affected region, including at the Salton Sea.

The key water supply impacts for IID under the QSA and related agreements arise from the IID agreement to a Priority 3 cap of 3.1 million AFY and a schedule for creating conserved water for transfer and environmental mitigation that is deducted from the cap of 3.1 million acre-feet per year. After year 2029 when all conserved water is created by improvement in water use efficiency, IID's reduced diversions allow IID to satisfy the same volume of water demand. The QSA, and other IID water rights, are described in further detail in **Appendix K**.

STATE

Department of Water Resources

Major responsibilities of the Department of Water Resources (DWR) include preparing and updating the California Water Plan to guide development and management of the state's water resources and planning, designing, constructing, operating, and maintaining the State Water Resources Development System. In addition, DWR cooperates with local agencies on water resources investigations, supports watershed and river restoration programs, encourages water conservation, explores conjunctive use of ground and surface water, facilitates voluntary water transfers, and, when needed, operates a state drought water bank.

California Water Code

California Water Code, Section 231 requires the California Department of Water Resources to develop well standards to protect California's groundwater quality. DWR Bulletin 74-90 (Supplement to Bulletin 74-81), California Well Standards, Water Wells, Monitoring Wells, Cathodic Protection Wells (1991), contains the minimum requirements for constructing, altering, maintaining, and destroying these types of wells. The standards apply to all water well drillers in California and the local agencies that enforce them.

Senate Bill (SB) 610 and SB 221

SB 610 (Chapter 643, Statutes of 2001) and SB 221 (Chapter 642, Statutes of 2001) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 and SB 221 are companion measures that seek to promote more collaborative planning between local water suppliers and cities and counties. Both statutes require detailed information regarding water availability to be provided to city and county decision-makers prior to approval of specified large development projects. Both statutes also require this detailed information be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county on such projects. Both measures recognize local control and decision-making regarding the availability of water for projects and the approval of projects.

Water Code Sections 10910–10915 require lead agencies to identify the public water system that may supply water for a proposed development project and to request from that public water system a water supply assessment (WSA) for the project. The purpose of the WSA is to demonstrate that the public water system has sufficient water supplies to meet the water demands associated with the proposed project in addition to meeting the existing and planned future water demands projected for the next 20 years.

A WSA is required for:

- A proposed residential development of more than 500 dwelling units.
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
- A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
- A proposed hotel or motel, or both, having more than 500 rooms.
- A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
- A mixed-use development that includes one or more of the uses described above.
- A development that would demand an amount of water equivalent to or greater than the amount of water required by a 500 dwelling-unit project.
- For lead agencies with fewer than 5,000 water service connections, any new development that will increase the number of water service connections in the service area by 10 percent or more.

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LOCAL

Imperial County General Plan

Table 4.13-5 summarizes the proposed project's consistency with applicable General Plan policies that relate to water supply. While this Draft EIR analyzes the proposed East Brawley Geothermal Development project's consistency with the General Plan pursuant to California Environmental Quality Act (CEQA) Guidelines Section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

**TABLE 4.13-5
PROJECT CONSISTENCY WITH GENERAL PLAN WATER POLICIES**

General Plan Policies	Consistency with General Plan	Analysis
Geothermal/Alternative Energy and Transmission Element		
Goal 3: Geothermal/alternative energy operations will be required to efficiently utilize water.		
Objective 3.1. Maintain at least the present level of agricultural production while encouraging efficient water use.	Yes	The portion of the project site not developed with the proposed geothermal plant facilities and well pads will continue to be used for agricultural production.
Objective 3.3. Encourage the efficient utilization of water in geothermal/alternative energy operations, and foster the use of non-irrigation water by these industries.	Yes	The proposed project will primarily utilize reclaimed water from the Brawley WWTP.

Imperial County Land Use Ordinance, Division 21, Water Well Regulations

The Well Water Regulations set forth "minimum requirements . . . for the construction, re-construction, repair, replacement, re-perforation, re-activation, operation, and destruction of a well or wells." Chapter two of the regulations set forth the requirements for application for and issuance of a Conditional Use Permit for the development of a new well. Chapter Three sets forth well standards for the construction, repair, reconstruction, alteration, reactivation, operation, or abandonment of wells, incorporating by reference California Department of Water Resources Bulletins 74-81 and 74-90. Also, addressed in this chapter are special groundwater protection standards for areas where potable groundwater quality is known to exist and where a well will penetrate more than one aquifer.

Imperial Irrigation District Draft Integrated Water Resources Management Plan

IID has developed a Draft Integrated Water Resources Management Plan (IWRMP) and is in the processing of finalizing the plan. The Final IWRMP will identify and recommend potential programs and projects to develop new water supplies and new storage, enhance the reliability of existing supplies, and provide more flexibility for district water department operations, all in order to maintain service levels within the IID's existing water service area.

Imperial Irrigation District Interim Water Supply Policy for Non-Agricultural Projects

IID currently has an Interim Water Supply Policy in place to address water supply for upcoming nonagricultural projects prior to adoption of its Final IWRMP. The policy currently designates a total of 25,000 AFY for these projects. A goal of the IWRMP is to increase the quantity of water available for nonagricultural projects from the current policy's 25,000 acre-feet per year to 50,000 AFY in order to meet expected future demands of these projects (IID 2009).

4.13.1.3 Impacts and Mitigation Measures

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following State CEQA Guidelines **Appendix G** thresholds of significance. The project would have a significant impact on water supply and services if it would:

- 1) Require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which would cause significant environmental effects.
- 2) Not have sufficient water supplies available to serve the project from existing entitlements and resources, or if new or expanded entitlements are needed.

METHODOLOGY

Evaluation of potential water supply impacts of the proposed project were based on a water supply assessment prepared by Development Design & Engineering, Inc. in 2010 (see **Appendix K**) and review of the Imperial County General Plan and Land Use Ordinance.

IMPACTS AND MITIGATION MEASURES

Water Treatment Facilities

Impact 4.13.1.1 Water obtained from the Brawley Wastewater Treatment Plant (BWWTP) would require tertiary level treatment prior to use as cooling makeup water at the proposed geothermal plant. As such, upgrades at the BWWTP will be required. This impact would be **less than significant**.

The proposed project is estimated to have a total water demand of 5,500 acre-feet per year, which will be almost entirely consumed in the power plant's cooling water system as make-up water to replace cooling water that evaporates or that is discharged (blowdown water). A relatively small portion of the water will be consumed in the control room building and labeled as nonpotable. This water will be obtained primarily from the outflow of the Brawley Wastewater Treatment Plant. The BWWTP currently provides only secondary treatment prior to discharging to the New River and ultimately the Salton Sea. As part of the proposed project, the BWWTP would be upgraded to provide tertiary treatment, allowing the outflow to be utilized for plant operations.

The proposed BWWTP upgrades will occur within the existing plant facilities and would generally include the installation of new treatment systems and equipment including pipelines, pumps, sedimentation tanks and basins, and filtering equipment. The upgrade would not increase the capacity of the existing Brawley Wastewater Treatment Plant. The BWWTP site has been

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previously disturbed and developed. As such, the proposed upgrades are not anticipated to result in any significant adverse impacts to the environment.

Water obtained from IID will require treatment prior to its use for plant operations. The canal water will be treated at the water intake point in the cooling towers, with chemicals automatically dispensed inside of the cooling tower. These additives include sodium hypochlorite for disinfection/biocide, corrosion inhibitor, calcium carbonate inhibitors, dispersants, bio-detergent/surfactant, and sulfuric acid to control pH in the tower. The applicable chemicals will be reported in the facility's hazardous materials business plan (HMBP) and are the same as used at the North Brawley plant and most or all of Ormat's other plants in Imperial County.

Bottled or bulk drinking water from an approved provider will be supplied for employee use.

A pipeline will be installed to convey the reclaimed water from the BWWTP to the project site. The potential environmental consequences of this (soil erosion and water quality degradation, disturbance of biological and/or cultural resources, air emissions from construction equipment and worker trips, temporary aesthetic impacts, etc.) are addressed throughout this Draft EIR and, where necessary, are mitigated to a level of insignificance. The reader is referred to Section 4.4, Biological and Natural Resources, for a discussion of potential project impacts to the hydrology and ecology of the New River and the Salton Sea. This impact is considered to be **less than significant**.

Mitigation Measures

None required.

Adequate Water Supplies and Entitlements

Impact 4.13.1.2 The proposed project would have a total water demand of approximately 5,500 acre-feet per year, which would be obtained from IID and the City of Brawley's Wastewater Treatment Plant. According to the water supply assessment (DDE 2010), adequate water supplies and entitlements are available to serve the proposed project. This impact is considered **less than significant**.

As stated above, the project site is currently used for agricultural production and is irrigated with water purchased from IID. At buildout, the project proposes to take an estimated 136.75 acres (or 4.5 percent) of the project site out of agricultural production. Based on 10 consecutive years (1998–2007) of delivery records from IID, this area has an existing average water demand of approximately 630 AFY. Based on the 2009 annual apportionment for agricultural lands in Imperial Valley, which is 5.25 acre-feet per acre, this area has an existing water demand of approximately 719 AFY (DDE 2010, pp. 44–46).

Upon buildout, the proposed project will have a total water demand of approximately 5,500 acre-feet per year. This is a 665 to 773 percent increase over existing demand estimates. Initially, the project proposes to obtain the entire 5,500 acre-feet from IID. Upon completion of the proposed BWWTP upgrades to provide tertiary treatment (expected in 2014), the project will utilize reclaimed water from the plant as its primary supply. The upgraded plant is projected to have an average daily flow of 3.9 million gallons per day, or 4,369 AFY. The remaining approximately 1,131 acre-feet per year (5,500 – 4,369 = 1,131) will continue to be purchased from IID as necessary.

IID will provide water to the project under its Interim Water Supply Policy, which currently designates a total of 25,000 acre-feet per year for nonagricultural projects that will rely on a water supply from IID during the period of time before adoption of its Final IWRMP. Currently, very

little of this 25,000 AFY has been allocated to other nonagricultural projects and is therefore available to serve the proposed project. The Final IWRMP is projected to make up to 50,000 AFY of water available to nonagricultural projects. According to the WSA prepared for the proposed project (**Appendix K**), IID has adequate policies, programs, and projects in place to provide water to its agricultural, commercial, industrial, and municipal users in its service boundary for 20 years, during both normal and single dry years. Additionally, IID's Equitable Distribution Plan is sufficient to manage water supply during multiple dry years. Historically, IID has never been denied the right to use the amount of water it has requested for agricultural purposes and other beneficial uses. Furthermore, since municipal and industrial water users in IID's service area have the highest apportionment priority for water supply available for equitable distribution during years of supply demand imbalance, this water supply is considered reliable.

Similarly, because of its high priority as a municipal use, the average daily flow from the BWWTP is a reliable supply of treated wastewater for the life of the BWWTP and is therefore also considered a reliable water supply for the proposed project.

The WSA prepared for the proposed project and the analysis provided above conclude that the water supply from the future completion of the BWWTP, in conjunction with IID's water supply in association with its Interim Water Supply Policy, is sufficient to meet project needs. No new or expanded entitlements are needed. Therefore, this impact is **less than significant**.

Mitigation Measures

None required.

4.13.1.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

For the purposes of this water supply analysis, the cumulative study area consists of pending, approved, and other reasonably foreseeable nonagricultural projects in IID's service area. Based upon known pending requests to IID for water supply assessments/verifications and pending applications to the County for various nonagricultural projects, IID currently estimates that up to 50,000 acre-feet per year of water could potentially be requested for nonagricultural projects over the next ten to twenty years (IID 2009).

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impact to Water Supply

Impact 4.13.1.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase demand for water from IID. However, IID will have sufficient water supplies from existing entitlements to serve future growth. This impact is considered **less than cumulatively considerable**.

As described above, the proposed project would have a total water demand of 5,500 acre-feet per year, which would be obtained entirely from IID until the proposed upgrades to the Brawley Wastewater Treatment Plant are completed (anticipated in 2014). Following completion of these upgrades, the project will obtain most of its water demand (4,369 AFY) from the outflow of the BWWTP. The project will continue to purchase the remaining demand (1,131 AFY) from IID.

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However, based on population projections for Brawley, it is estimated that the outflow of the BWWTP will be sufficient to meet project demand within approximately 10 years, at which point no water would be required from IID.

IID's IWSP designates 25,000 AFY for nonagricultural uses. Most of this water has not yet been allocated and will be available for the proposed project. The Final IWRMP is anticipated to increase the amount designated for nonagricultural projects to 50,000 AFY when adopted in order to meet projected future demands. As discussed under Impact 4.13.1.2 above, IID has adequate policies, programs, and projects in place to provide water to its users for 20 years, during both normal and single dry years. Additionally, IID's Equitable Distribution Plan is sufficient to manage water supply during multiple dry years. Furthermore, IID is currently developing an Integrated Water Resources Management Plan (IWRMP) that will identify and recommend potential programs and projects to develop new water supplies and new storage, and enhance the reliability of existing supplies in order to maintain service levels as water demands increase in the future. Nonagricultural projects will be charged a water supply development fee in order to fund implementation of the IWRMP and related water supply projects.

As IID has sufficient existing supplies and entitlements to serve anticipated nonagricultural projects in the future, including the proposed project, this impact is considered **less than cumulatively considerable**.

Mitigation Measures

None required.

4.13.2 WASTEWATER SERVICE

4.13.2.1 EXISTING SETTING

The project site primarily comprises agricultural and undeveloped land. However, there are several existing residential dwelling units associated with the agricultural activities on the project site. These residences are served by on-site septic systems. No public wastewater services are provided on the project site.

4.13.2.2 REGULATORY FRAMEWORK

FEDERAL

Clean Water Act

In 1972, the Clean Water Act (CWA) was adopted to protect the waters of the nation. The Environmental Protection Agency (EPA) and corresponding state agencies regulate public wastewater systems to ensure compliance with the CWA. To implement the CWA regulatory standards, the National Pollutant Discharge Elimination System (NPDES) Permit Program was instituted.

The CWA requires that all point sources discharging pollutants into waters of the United States must obtain a NPDES permit. The EPA defines a point source as a discrete conveyance such as pipes or man-made ditches. Facilities must obtain permits if their discharges go directly to surface waters. Pollutants that may threaten public health and the nation's waters include human waste, ground-up food from sink disposals, laundry and bath water, toxic chemicals, oil and grease, metals, and pesticides.

National Pollutant Discharge Elimination System Permit

Discharge of treated wastewater to surface water(s) of the United States, including wetlands, requires an NPDES permit. In California, the Regional Water Quality Control Boards (RWQCB) administer the issuance of these federal permits. Obtaining an NPDES permit requires preparation of detailed information, including characterization of wastewater sources, treatment processes, and effluent quality. Whether or not a permit is issued and the conditions of a permit are subject to many factors such as a basin plan water quality objectives, impaired water body status of the receiving water, historical flow rates of the receiving water, effluent quality and flow, the State Implementation Plan (SIP) and the California Toxics Rule (CTR), and established Total Maximum Daily Load (TMDL) rates for various pollutants. These factors are highly specific to the potential discharge point. Obtaining an NPDES permit is generally considered difficult in inland areas and may not be possible in sensitive areas.

STATE

Porter-Cologne Water Quality Act

In 1969, the California Legislature enacted the Porter-Cologne Water Quality Control Act to preserve, enhance, and restore the quality of the state's water resources. The act established the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards as the principal state agencies with the responsibility for controlling water quality in California. Under the act, water quality policy is established, water quality standards are enforced for both surface water and groundwater, and the discharges of pollutants from point and nonpoint sources are regulated. The act authorizes the SWRCB to establish water quality principles and guidelines for long-range resource planning including groundwater and surface water management programs and control and use of recycled water.

State Water Resources Control Board

The mission of the SWRCB is to ensure the highest reasonable quality for waters of the state, while allocating those waters to achieve the optimum balance of beneficial uses. The joint authority of water allocation and water quality protection enables the SWRCB to provide comprehensive protection for California's waters.

There are nine Regional Water Quality Control Boards (RWQCBs) in the state. The mission of the RWQCBs is to develop and enforce water quality objectives and implementation plans that will best protect the beneficial uses of the state's waters, recognizing local differences in climate, topography, geology, and hydrology.

The proposed project falls within the jurisdiction of the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB), Region 7. CRBRWQB regulates the discharge of waste to surface waters (rivers, streams, lakes, wetlands, and the Pacific Ocean) as well as to storm drains, to the ground surface, and to groundwater.

It is the policy of the SWRCB "to promote the use of recycled water to the maximum extent in order to supplement existing surface and ground water supplies to help meet water needs (California Water Code (CWC) Sections 13510–13512). One of the primary conditions on the use of recycled water is protection of public health (CWC Sections 13521, 13522, 13550(a)(3)) (SWRCB 2009). Any project or individual proposing to recycle water and use recycled water must file a report with the appropriate regional water board (CWC Section 13522.5). If a regional water board determines that

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it is necessary to protect public health, safety, or welfare, it may prescribe water recycling requirements where recycled water is used or proposed to be used (CWC Section 13523).

Department of Health Services

The regional water boards must consult with and consider recommendations of the Department of Health Services (DHS) when issuing waste discharge/water recycling requirements (CWC Section 13523). The DHS is statutorily required to establish uniform statewide recycling criteria for the various uses of recycled water to assure protection of public health where recycled water use is involved. DHS regulatory criteria include specified approved uses of recycled water, numerical limitations and requirements, treatment method requirements and performance standards. DHS regulations allow use of alternate methods of treatment in some cases, so long as the alternate methods are determined by DHS to provide equivalent treatment and reliability.

The 1996 Memorandum of Agreement between the Department of Health Services, State Water Resources Control Board, and the regional water boards on the use of recycled water allocates primary areas of responsibility and authority between these agencies. The Memorandum of Agreement provides methods and mechanisms necessary to assure ongoing and continuous future coordination of activities relative to the use of recycled water in California.

Wastewater Recycling Statutes and Regulations

Wastewater recycling in California is regulated under the California Code of Regulations (CCR) Title 17 and Title 22, Division 4, and statutes from the Health and Safety Code and Water Code. The intent of these statutes and regulations is to ensure protection of public health associated with the use of recycled water. The California Department of Health Services has jurisdiction over the distribution of recycled wastewater and the enforcement of Title 22 regulations. The Colorado River Basin Regional Water Quality Control Board also may be responsible for the reuse requirements associated with wastewater reclamation in the project area.

REGIONAL

Regional Water Quality Control Board – Region 7, Order No. 93-600

Order No. 93-600 regulates on-site subsurface wastewater disposal systems for fuel service stations, auto garages, vehicle maintenance/wrecking yards, machine shops, and car washes.

Regional Water Quality Control Board – Region 7, Order No. 97-500

Order No. 97-500 is designed to regulate on-site, subsurface wastewater disposal systems for restaurants, residential developments, and other commercial facilities, among other various uses. These facilities have the potential to cause contamination of the state's groundwater resources from total dissolved solids, volatile organic compounds, pH, nitrate, nitrogen, and other pollutants. The order defines on-site subsurface disposal systems as wastewater disposal systems that use septic tanks followed by subsurface infiltration of wastewater as a primary disposal method.

LOCAL**County of Imperial General Plan**

The General Plan contains goals and objectives that relate to wastewater service issues. However, the General Plan does not include policies or programs specific to septic system activities or requirements. Since the project proposes the installation and use of an on-site septic system designed to accommodate the permanent and part-time employees, consistency analysis with the Imperial County General Plan is not applicable.

The Imperial County Public Health Department, Environmental Health & Consumer Protection Services

The County Health Officer is responsible for issuance of sanitation permits for private on-site sewage disposal systems in the county. Coordination of site design for proposed projects must occur with the Public Health Department to obtain final permits (Imperial County Public Health Department 2009).

Imperial County Land Use Ordinance, Division 10 Building, Grading and & Sewage Regulations

Chapter 13, Sanitation Permits, regulates the construction, relocation, and alteration of sewage disposal systems in the unincorporated areas of Imperial County. Standards for such systems described within this chapter must be met for a permit to be issued by the Public Health Department.

4.13.2.3 IMPACTS AND MITIGATION MEASURES**STANDARDS OF SIGNIFICANCE**

The following standards are based on State CEQA Guidelines **Appendix G**. A significant impact to wastewater treatment would occur if implementation of the proposed project would result in any of the following:

- 1) Require or result in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental impacts.
- 2) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

METHODOLOGY

The following evaluation of the proposed project's potential wastewater treatment impacts is based upon review of the Imperial County General Plan and Land Use Ordinance.

PROJECT IMPACTS AND MITIGATION MEASURES**Wastewater Treatment Facilities**

- Impact 4.13.2.1** The proposed project would generate demand for sewage treatment in an area that is not currently served by a sewer district and would require the construction of an on-site septic system. This impact would be **less than significant**.

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All water used for plant processes (i.e., geothermal fluid from power plant and blowdown from cooling towers) would be injected back into the geothermal reservoir. However, an on-site sewage treatment facility would be required for all other wastewater such as sewage generated at the proposed control room, office, and maintenance shop. This septic system would require a permit from the Imperial County Public Health Department, Section of Environmental Health and Consumer Protection Services. Issuance and compliance with this permit would ensure that the proposed septic system is properly designed, constructed, and maintained and would not adversely affect water quality or public health. Therefore, this impact is considered **less than significant**.

Mitigation Measures

None required.

4.13.2.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for wastewater impacts is Imperial County and the nearby City of Brawley. Cumulative development includes buildout of the Imperial County General Plan as well as any existing, approved, proposed, and reasonably foreseeable development within the cumulative study area, as described in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this DEIR. The cumulative impact analysis herein focuses on the proposed project's contribution to cumulative wastewater facility impacts and whether that contribution is considered considerable.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

The project site is not served by a sanitation district or sewer treatment facility. Existing residences and other developed uses on the project site rely on individual septic systems to accommodate wastewater.

Cumulative Impact to Wastewater Services

Impact 4.13.2.2 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could increase demand for wastewater treatment services. This impact is considered **less than cumulatively considerable**.

The proposed project will inject all water associated with plant operations (e.g., geothermal brine and cooling tower blowdown) back into the geothermal reservoir. All wastewater associated with employees and general operation of the control room, office, and maintenance shop would be treated via a private, on-site septic system. The proposed system, and all other future wastewater systems in the county, would be required to adhere to all state, regional, and local regulations and ordinances regarding wastewater discharge, including a permit from the Imperial County Public Health Department, Section of Environmental Health and Consumer Protection Services.

Because the proposed project would be required to adhere to all state, regional, and local regulations and ordinances regarding wastewater discharge, regional water quality would not be significantly impacted from wastewater disposal. Consequently, there are no projects that would,

in combination with the proposed project, result in any significant impact related to wastewater treatment. Therefore, cumulative impacts would be **less than cumulatively considerable**.

Mitigation Measures

None required.

4.13.3 ELECTRICAL, NATURAL GAS, AND TELEPHONE SERVICES

4.13.3.1 EXISTING SETTING

ELECTRICAL SERVICE

Imperial Irrigation District (IID) Energy provides electric power to more than 145,000 customers in the Imperial Valley and parts of Riverside and San Diego counties. As the sixth largest utility in California, IID Energy controls more than 1,100 megawatts of energy derived from a diverse resource portfolio that includes its own generation and long- and short-term power purchases (IID 2010).

The existing developed uses in the vicinity of the project site (i.e., residences, golf course, radio tower, and cattle feedlot) are supplied electrical service by IID Energy. Overhead power lines exist along several of the roadways in the project vicinity.

NATURAL GAS

The Southern California Gas Company provides natural gas service in the vicinity of the project site. A transmission pipeline is located generally parallel to State Route 111 just west of the project site (Southern California Gas Company 2008).

TELEPHONE

AT&T provides telephone service in the vicinity of the project site, and associated infrastructure is available adjacent to the project site.

4.13.3.2 REGULATORY FRAMEWORK

STATE

Title 24, California Code of Regulations

CCR Title 24, California Building Standards, contains energy efficiency standards related to nonresidential buildings.

LOCAL

Imperial County General Plan

The Imperial County General Plan does not contain any policies relating to provision of electrical, natural gas, or telephone services.

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4.13.3.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the State CEQA Guidelines **Appendix G** thresholds of significance. The project would have a significant impact on electrical, natural gas and telephone service if it would:

- 1) Result in the need for new systems or supplies, or a substantial expansion or alteration to electricity, natural gas, or telephone that results in a physical impact on the environment.

The project does not propose the extension of natural gas lines to serve the project site; therefore, no impacts would occur relative to the need for expanded natural gas facilities. The issue will not be discussed further in this Draft EIR.

METHODOLOGY

Evaluation of potential impacts on electrical, natural gas, and telephone services resulting from the proposed project was based on consultation with the service providers and a review of California Energy Commission policies, state standards, and the Imperial County General Plan. The analysis focuses on the environmental effects associated with the provision of these services to the proposed project.

IMPACTS AND MITIGATION MEASURES

Electrical Service

Impact 4.13.3.1 The project site is currently provided electric service by IID Energy. The proposed project's anticipated power demands would not require improvements to IID's distribution system. Therefore, this impact is **less than significant**.

The project site is currently provided electric service by IID Energy, and distribution infrastructure is available on the project site. The anticipated power demands of the proposed project would not require improvements to IID Energy's distribution system. However, should any additional cabling or distribution facilities be required to establish service at the proposed structures, installation would be coordinated with Imperial County and IID Energy. All utility lines would be placed in underground conduit. Should placement of any utilities within County road right-of-way be required, the project applicant would be required to secure an encroachment permit from the Department of Public Works.

Once operational, the proposed project would generate approximately 49.9 net megawatts of electricity per year. The project proposes to construct a substation adjacent to the power plant that would convert power generated at the plant to the proposed line voltage of 92 kilovolts (kV). The converted electricity would be transferred via a 2-mile-long double-circuit 13.8- and 92-kV interconnection transmission line along 66-foot-high poles. This interconnection transmission line would transfer the electricity to the IID Energy grid at the North Brawley 1 substation at Hovley and Andre roads for distribution.

Installation of the infrastructure described above would require ground-disturbing activities, the potential environmental effects of which are addressed throughout this Draft EIR. These effects could include temporary and permanent aesthetic impacts, soil erosion, water quality

degradation, disturbance of biological and cultural resources, excessive noise from construction equipment, and temporary roadway closures. These issues are adequately addressed in the appropriate sections of this Draft EIR. This impact is considered **less than significant**.

Mitigation Measures

None required.

Telephone Service

Impact 4.13.3.2 The proposed project would not require the extension of telephone service infrastructure. The impact would be **less than significant**.

Telephone service in the vicinity of the project site is provided by AT&T, and associated infrastructure is currently available on the project site. The proposed project would not require a substantial number of new telephone lines and would not require the extension or expansion of SBCs distribution infrastructure. However, should any additional cabling or distribution facilities be required to establish service at the proposed structures, installation would be coordinated with Imperial County and AT&T. All utility lines would be placed in underground conduit. Should placement of any utilities within County road right-of-way be required, the project applicant would be required to secure an encroachment permit from the Department of Public Works.

The installation of underground utilities would require ground-disturbing activities, the potential environmental effects of which are addressed throughout this Draft EIR. These effects could include temporary aesthetic impacts, soil erosion, water quality degradation, disturbance of biological and cultural resources, excessive noise from construction equipment, and temporary roadway closures. These issues are adequately addressed in the appropriate sections of this Draft EIR. This impact is considered **less than significant**.

Mitigation Measures

None required.

4.13.3.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for electrical, natural gas, and telephone services impacts is Imperial County and the nearby City of Brawley. Cumulative development includes buildout of the Imperial County General Plan as well as any existing, approved, proposed, and reasonably foreseeable development within the cumulative study area, as described in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this DEIR. The cumulative impact analysis herein focuses on the proposed project's contribution to cumulative electrical, natural gas, and telephone services impacts and whether that contribution is considered considerable.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Unincorporated Imperial County is provided electric service by IID Energy and telephone service by AT&T.

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Cumulative Impact to Electric Services

Impact 4.13.3.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase demand for electric service. However, the proposed project would not require improvements to IID Energy's distribution system and would not contribute significantly to this cumulative impact. This impact is considered **less than cumulatively considerable**.

As described under Impact 4.13.3.1, the project site is currently provided electrical service by IID Energy, and existing distribution infrastructure is present on and adjacent to the project site. The proposed project would not have significant demand for electricity and would not require the extension or expansion of distribution infrastructure. Furthermore, once operational, the proposed project would generate approximately 49.9 net megawatts of electricity per year from a renewal source and would be considered a beneficial effect on regional electrical generation and use. The proposed project would not significantly contribute to the cumulative increase in demand for electrical service. This impact is considered **less than cumulatively considerable**.

Mitigation Measures

None required.

Cumulative Impact to Telephone Services

Impact 4.13.3.4 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in increased demand for telephone services. However, the proposed project would not require improvements to AT&T's distribution system and would not contribute significantly to this cumulative impact. This impact is considered **less than cumulatively considerable**.

As described under Impact 4.13.3.2, the project site is currently provided telephone service by AT&T, and existing distribution infrastructure is present on and adjacent to the project site. The proposed project would not have significant demand for telephone service and would not require the extension or expansion of distribution infrastructure. As such, this impact is considered **less than cumulatively considerable**.

Mitigation Measures

None required.

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4.14 CLIMATE CHANGE AND GREENHOUSE GASES

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) analyzes the potential climate change impacts that would result from the development of the proposed East Brawley Geothermal Development project and is based on the air quality assessment prepared for the project by Environmental Management Associates, Inc. (see **Appendix D**).

4.14.1 ENVIRONMENTAL SETTING

GREENHOUSE GASES

Various gases in the earth's atmosphere, classified as atmospheric greenhouse gases (GHGs), play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space, and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

For most nonindustrial development projects, motor vehicles make up the bulk of GHG emissions produced on an operational basis. The primary greenhouse gases emitted by motor vehicles include carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons. Following are descriptions of the primary greenhouse gases attributed to global climate change, including a description of the physical properties, contribution to the greenhouse effect, and primary sources.

Carbon dioxide (CO₂) is released to the atmosphere when solid waste, fossil fuels (oil, natural gas, and coal), and wood and wood products are burned. CO₂ emissions from motor vehicles generally occur directly from operation of the vehicles and from operation of air conditioning systems.

Methane (CH₄) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from the decomposition of organic waste in solid waste landfills, the raising of livestock, natural gas and petroleum systems, stationary and mobile combustion, wastewater treatment, and certain industrial processes. Methane emissions from motor vehicles generally occur directly from operation of vehicles, though mobile sources represent 0.5 percent of overall methane emissions.

Nitrous oxide (N₂O) is emitted during agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels. Mobile sources represent about 14 percent of N₂O emissions. N₂O emissions from motor vehicles generally occur directly from operation of vehicles.

Hydrofluorocarbons (HFCs) are one of several high global warming potential (GWP) gases that are not naturally occurring and are generated in a variety of industrial processes. HFC (refrigerant) emissions from vehicle air conditioning systems can occur due to leakage, losses during recharging, or release from scrappage of vehicles at the end of their useful lives.

Perfluorocarbons (PFCs) are another of several high GWP gases that are not naturally occurring and are generated in a variety of industrial processes. Emissions of PFCs are generally negligible from motor vehicles.

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Sulfur hexafluoride (SF₆) is another of several high GWP gases that are not naturally occurring and are generated in a variety of industrial processes. Emissions of SF₆ are generally negligible from motor vehicles.

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. High GWP gases such as HFCs, PFCs, and SF₆ are the most heat-absorbent. Methane traps over 21 times more heat per molecule than CO₂, and N₂O absorbs 310 times more heat per molecule than CO₂. Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO₂e), which weight each gas by its GWP. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO₂ were being emitted. **Table 4.14-1** shows the GWPs for different GHGs for a 100-year time horizon.

TABLE 4.14-1
GLOBAL WARMING POTENTIALS FOR GREENHOUSE GASES

Greenhouse Gas	Global Warming Potential
Carbon Dioxide (CO ₂)	1
Methane (CH ₄)	21
Nitrous Oxide (N ₂ O)	310
Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs)	6,500
Sulfur Hexafluoride (SF ₆)	23,900

Source: BAAQMD, 2006

EFFECTS OF GLOBAL CLIMATE CHANGE

California can draw on substantial scientific research conducted by experts at various state universities and research institutions. With more than a decade of concerted research, scientists have established that the early signs of climate change are already evident in the state—as shown, for example, in increased average temperatures, changes in temperature extremes, reduced snowpack in the Sierra Nevada, sea level rise, and ecological shifts.

Many of these changes are accelerating, locally, across the country, and around the globe. As a result of emissions already released into the atmosphere, California will face intensifying climate changes in coming decades (CNRA 2009). Generally, research indicates that California should expect overall hotter and drier conditions with a continued reduction in winter snow (with concurrent increases in winter rains), as well as increased average temperatures and accelerating sea level rise. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing (CNRA 2009).

Climate change temperature projections identified in the 2009 California Climate Adaptation Strategy suggest the following (CNRA 2009):

- Average temperature increase is expected to be more pronounced in the summer than in the winter season.
- Inland areas are likely to experience more pronounced warming than coastal regions.

- Heat waves are expected to increase in frequency, with individual heat waves also showing a tendency toward becoming longer, and extending over a larger area, thus more likely to encompass multiple population centers in California at the same time.
- As GHGs remain in the atmosphere for decades, temperature changes over the next 30 to 40 years are already largely determined by past emissions. By 2050, temperatures are projected to increase by an additional 1.8 to 5.4°F (an increase one to three times as large as that which occurred over the entire 20th century).
- By 2100, the models project temperature increases between 3.6 to 9°F.

Precipitation levels are expected to change over the 21st century, though models differ in determining where and how much rain and snowfall patterns will change (CNRA 2009). Eleven out of twelve precipitation models run by the Scripps Institution of Oceanography suggest a small to significant (12–35 percent) overall decrease in precipitation levels by mid-century (CNRA 2009). In addition, higher temperatures increase evaporation and make for a generally drier climate, as higher temperatures hasten snowmelt and increase evaporation and make for a generally drier climate. Moreover, the 2009 California Climate Adaptation Strategy concludes that more precipitation will fall as rain rather than as snow, with important implications for water management in the state. California communities have largely depended on runoff from yearly established snowpack to provide the water supplies during the warmer, drier months of late spring, summer, and early autumn. With rainfall and meltwater running off earlier in the year, the state will face increasing challenges of storing the water for the dry season while protecting Californians downstream from floodwaters during the wet season.

Changes in average temperature and precipitation are significant. Yet gradual changes in average conditions are not all for which California must prepare. In the next few decades, it is likely that the state will face a growing number of climate change-related extreme events such as heat waves, wildfires, droughts, and floods. Because communities, infrastructure, and other assets are at risk, such events can cause significant damages and are already responsible for a large fraction of near-term climate-related impacts every year (CNRA 2009).

Most climate projections developed to date, including those used in this report, produce gradual if sometimes substantial changes for a given climate variable. In the past, rapid climate changes have been observed and scientists are increasingly concerned about additional abrupt changes that could push natural systems past thresholds beyond which they could not recover. Such events have been recorded in paleoclimatological records, but current global climate models cannot predict when they may occur again (CNRA 2009). Such abrupt changes have been shown to occur over very short periods of time (a few years to decades) and thus represent the most challenging situations to which society and ecosystems would need to adapt (CNRA 2009). Short of being able to predict such abrupt changes, scientists are focusing their attention on aspects of the climate and earth system called “tipping elements” that can rapidly bring about abrupt changes.

Tipping elements refer to thresholds where increases in temperature cause a chain reaction of mutually reinforcing physical processes in the earth’s dynamic cycles. The most dangerous of these include the following: (CNRA 2009)

- A reduction in Arctic sea ice, which allows the (darker) polar oceans to absorb more sunlight, thereby increasing regional warming, accelerating sea ice melting even further, and enhancing Arctic warming over neighboring (currently frozen) land areas.

4.14 CLIMATE CHANGE AND GREENHOUSE GASES

- The release of methane (a potent GHG), which is currently trapped in frozen ground (permafrost) in the Arctic tundra, will increase with regional warming and melting of the ground, leading to further and more rapid warming and resulting in increased permafrost melting.
- Continued warming in the Amazon could cause significant rainfall loss and large scale dying of forest vegetation, which will further release CO₂.
- The accelerated melting of Greenland and West Antarctic ice sheets observed in recent times, together with regional warming over land and in the oceans, involves mechanisms that can reinforce the loss of ice and increase the rate of global sea level rise.

According to the 2009 California Climate Adaptation Strategy, the impacts of global warming in California have the potential to include, but are not limited to, the following areas:

Public Health

Climate change is expected to lead to an increase in ambient (i.e., outdoor) average air temperature, with greater increases expected in summer than in winter months. Larger temperature increases are anticipated in inland communities as compared to the California coast. The potential health impacts from sustained and significantly higher than average temperatures include heat stroke, heat exhaustion, and the exacerbation of existing medical conditions such as cardiovascular and respiratory diseases, diabetes, nervous system disorders, emphysema, and epilepsy. Numerous studies have indicated that there are generally more deaths during periods of sustained higher temperatures, and these are due to cardiovascular causes and other chronic diseases. The elderly, infants, and socially isolated people with pre-existing illnesses who lack access to air conditioning or cooling spaces are among the most at risk during heat waves (CNRA 2009).

Floods and Droughts

The impacts of flooding can be significant. Results may include population displacement, severe psychosocial stress with resulting mental health impacts, exacerbation of pre-existing chronic conditions, and infectious disease (CNRA 2009). Additionally, impacts can include a loss of personal belongings, and the emotional ramifications from such loss, to direct injury and/or mortality.

Drinking water contamination outbreaks in the United States are associated with extreme precipitation events (CNRA 2009). Runoff from rainfall is also associated with coastal contamination that can lead to contamination of shellfish and contribute to food-borne illness. Floodwaters may contain household, industrial, and agricultural chemicals as well as sewage and animal waste. Flooding and heavy rainfall events can wash pathogens and chemicals from contaminated soils, farms, and streets into drinking water supplies (CNRA 2009). Flooding may also overload storm and wastewater systems, or flood septic systems, also leading to possible contamination of drinking water systems (CNRA 2009).

Drought impacts develop more slowly over time. Risks to public health that Californians may face from drought include impacts on water supply and quality, food production (both agricultural and commercial fisheries), and risks of waterborne illness. As the amount of surface water supplies are reduced as a result of drought conditions, the amount of groundwater pumping is expected to increase to make up for the water shortfall. The increase in groundwater pumping has the potential to lower the water tables and cause land subsidence (CNRA 2009). Communities that utilize well water will be adversely affected by drops in water tables or through

changes in water quality. Groundwater supplies have higher levels of total dissolved solids compared to surface waters. This introduces a set of effects for consumers, such as repair and maintenance costs associated with mineral deposits in water heaters and other plumbing fixtures, and on public water system infrastructure designed for lower salinity surface water supplies. Drought may also lead to increased concentration of contaminants in drinking water supplies (CNRA 2009).

Water Resources

The state's water supply system already faces challenges to provide water for California's growing population. Climate change is expected to exacerbate these challenges through increased temperatures and possible changes in precipitation patterns. The trends of the last century—especially increases in hydrologic variability—will likely intensify in this century. We can expect to experience more frequent and larger floods and deeper droughts (CNRA 2009). Rising sea level will threaten the Delta water conveyance system and increase salinity in near-coastal groundwater supplies (CNRA 2009). Planning for and adapting to these simultaneous changes, particularly their impacts on public safety and long-term water supply reliability, will be among the most significant challenges facing water and flood managers this century.

Agriculture

Increased GHG emissions could cause widespread changes to the agriculture industry, reducing the quantity and quality of agricultural products statewide. First, California farmers could possibly lose as much as 25 percent of the water supply they need. California's farmers could face greater water demand for crops and a less reliable water supply as temperatures rise. Crop growth and development could change, as could the intensity and frequency of pest and disease outbreaks. Rising temperatures could aggravate ozone pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less than optimal development for many crops, so rising temperatures could worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits, and nuts. In addition, continued global climate change could shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion could occur in many species while range contractions may be less likely in rapidly evolving species with significant populations already established. Should range contractions occur, new or different weed species could fill the emerging gaps. Continued global climate change could alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

Forests and Landscapes

Global climate change has the potential to intensify the current threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation. If temperatures rise into the medium warming range, wildfire occurrence statewide could increase from 57 percent to 169 percent by 2085 (CNRA 2009). However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state.

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Rising Sea Levels

Rising sea levels, more intense coastal storms, and warmer water temperatures could increasingly threaten the state's coastal regions. Over the 20th century, sea level has risen by about 7 inches along the California coast (CNRA 2009). It is projected that sea level rise of up to 55 inches (1.4 meters) could occur by the end of this century (CNRA 2009). This projection accounts for the global growth of dams and reservoirs and how they can affect surface runoff into the oceans, but it does not account for the possibility of substantial ice melting from Greenland or the West Antarctic Ice Sheet, which would drive sea levels along the California coast even higher (CNRA 2009).

EXISTING ON-SITE CONDITIONS

The site consists of agricultural and undeveloped land, several residential dwelling units associated with agricultural activities, a golf course, a radio tower, and a cattle feedlot. A majority of the site comprises active agricultural lands, used for mainly alfalfa growth. A portion of the cattle feedlot is located near the northwestern portion of the site at the intersection of Kershaw Road and Rutherford Road.

4.14.2 REGULATORY FRAMEWORK

FEDERAL

Federal Regulation and the Clean Air Act

In the past, the U.S. Environmental Protection Agency (EPA) has not regulated GHGs under the Clean Air Act because it asserted that the act did not authorize it to issue mandatory regulations to address global climate change and that such regulation would be unwise without an unequivocally established causal link between GHGs and the increase in global surface air temperatures. However, the U.S. Supreme Court held that the EPA must consider regulation of motor vehicle GHG emissions. In *Massachusetts v. Environmental Protection Agency et al.*, twelve states and cities, including California, together with several environmental organizations, sued to require the EPA to regulate GHGs as pollutants under the Clean Air Act (127 S. Ct. 1438 (2007)). The Court ruled that GHGs fit within the Clean Air Act's definition of a pollutant and that the EPA did not have a valid rationale for not regulating GHGs. In response to this ruling, the EPA has recently made an endangerment finding that GHGs pose a threat to the public health and welfare. This is the first step necessary for the establishment of federal GHG regulations under the Clean Air Act.

STATE

Assembly Bill 1493

Assembly Bill (AB) 1493 (Pavley) of 2002, (Health and Safety Code Sections 42823 and 43018.5), requires the California Air Resources Board (CARB) to develop and adopt the nation's first GHG emission standards for automobiles. These standards are also known as "Pavley I." The California Legislature declared in AB 1493 that global warming is a matter of increasing concern for public health and the environment. It cites several risks that California faces from climate change, including a reduction in the state's water supply, an increase in air pollution caused by higher temperatures, harm to agriculture, an increase in wildfires, damage to the coastline, and economic losses caused by higher food, water, energy, and insurance prices. The bill also states that technological solutions to reduce GHG emissions would stimulate California's economy and

provide jobs. In 2004, the State of California submitted a request for a waiver from federal clean air regulations, as the State is authorized to do under the CAA, to allow the State to require reduced tailpipe emissions of CO₂. In late 2007, the EPA denied California's waiver request and declined to promulgate adequate federal regulations limiting GHG emissions. In early 2008, the State brought suit against the EPA related to this denial.

In January 2009, President Obama instructed the EPA to reconsider the Bush Administration's denial of California's and 13 other states' requests to implement global warming pollution standards for cars and trucks. In June 2009, the EPA granted California's waiver request, enabling the State to enforce its GHG emissions standards for new motor vehicles beginning with the current model year.

Also in 2009, President Obama announced a national policy aimed at both increasing fuel economy and reducing GHG pollution for all new cars and trucks sold in the United States. The new standards would cover model years 2012 to 2016 and would raise passenger vehicle fuel economy to a fleet average of 35.5 miles per gallon (mpg) by 2016. When the national program takes effect, California has committed to allowing automakers who show compliance with the national program to also be deemed in compliance with state requirements. California is committed to further strengthening these standards beginning in 2017 to obtain a 45 percent GHG reduction from the 2020 model year vehicles.

Executive Order S-3-05

Executive Order S-3-05 (State of California) proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The Secretary will also submit biannual reports to the governor and state legislature describing (1) progress made toward reaching the emission targets, (2) impacts of global warming on California's resources, and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of CalEPA created a Climate Action Team (CAT) made up of members from various state agencies and commissions. CAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

Assembly Bill 32 (AB 32) (Health and Safety Code Sections 38500, 38501, 28510, 38530, etc.¹) requires that statewide GHG emissions be reduced to 1990 levels by the year 2020. The gases that are regulated by AB 32 include CO₂, CH₄, N₂O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The reduction to 1990 levels will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement

¹ Assembly Bill 32 is codified at Health and Safety Code Sections 38500, 38501, 28510, 38530, 38550, 38560, 38561-38565, 38570, 38571, 38574, 38580, 38590, 38592-38599

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the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that CARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap, institute a schedule to meet the emissions cap, and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Climate Change Scoping Plan

In October of 2008, CARB published its Climate Change Proposed Scoping Plan, which is the State's plan to achieve GHG reductions in California required by AB 32. The scoping plan contains the main strategies California will implement to achieve reduction of 169 million metric tons (MMT) of CO₂e, or approximately 30 percent from the state's projected 2020 emission level of 596 MMT of CO₂e under a business-as-usual scenario (this is a reduction of 42 MMT CO₂e, or almost 10 percent, from 2002–2004 average emissions). The scoping plan also includes CARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The largest proposed GHG reduction recommendations are from improving emission standards for light-duty vehicles (estimated reductions of 31.7 MMT CO₂e), implementation of the Low-Carbon Fuel Standard (15.0 MMT CO₂e), energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO₂e), and a renewable portfolio standard for electricity production (21.3 MMT CO₂e). CARB has not yet determined what amount of GHG reductions it recommends from local government operations. However, the proposed scoping plan does state that land use planning and urban growth decisions will play an important role in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. (Meanwhile, CARB is also developing an additional protocol for community emissions.) CARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors. The proposed scoping plan states that the ultimate GHG reduction assignment to local government operations is to be determined. With regard to land use planning, the proposed scoping plan expects approximately 5.0 MMT CO₂e will be achieved associated with implementation of SB 375, which is discussed further below. The Climate Change Scoping Plan was approved by CARB on December 11, 2008.

Senate Bill 1368

Senate Bill 1368 (SB 1368) (codified at Public Utilities Code Chapter 3) is the companion bill of AB 32. SB 1368 required the California Public Utilities Commission (CPUC) to establish a greenhouse gas emission performance standard for baseload generation from investor-owned utilities by February 1, 2007. The bill also required the California Energy Commission (CEC) to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the greenhouse gas emission rate from a baseload combined-cycle natural-gas-fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and CEC.

California Climate Action Registry

The California Climate Action Registry (CCAR) was established in 2000 by Senate Bill 1771 (codified at Health and Safety Code Article 6 and Public Resources Code Chapter 8.5) and modified in 2001 by Senate Bill 527 (codified at Health and Safety Code Sections 42400.4, 42801, 42810, 42821, etc.²) as a nonprofit voluntary registry for GHG emissions. The purpose of CCAR is to help companies and organizations with operations in the state to establish GHG emissions baselines against which any future GHG emissions reduction requirements may be applied. CCAR has developed a general protocol and additional industry-specific protocols that provide guidance on how to inventory GHG emissions for participation in the registry. The California Climate Action Registry has now merged its GHG emissions registry with The Climate Registry and is primarily focused on offset projects and research.

Senate Bill 1078 and Governor's Order S-14-08 (California Renewables Portfolio Standards)

Senate Bill 1078 (SB 1078) (Public Utilities Code Sections 387, 390.1, 399.25 and Article 16) addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide a minimum 20 percent of their supply from renewable sources by 2017. SB 1078 changed the target date of this bill's implementation to 2010. This Senate Bill will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed Executive Order S-14-08, which set the Renewable Portfolio Standard target to 33 percent by 2020. It directed state government agencies and retail sellers of electricity to take all appropriate actions to implement this target.

Senate Bill 375

Senate Bill 375 (SB 375) (codified at Government Code and Public Resources Code³), signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires metropolitan planning organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's Regional Transportation Plan (RTP). CARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years, but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012.

Executive Order S-13-08: The Climate Adaptation and Sea Level Rise Planning Directive

On November 14, 2008, Governor Schwarzenegger issued Executive Order S-13-08 in order to reduce and assess California's vulnerability to climate change and sea level rise. The Executive Order initiated four major actions:

² Senate Bill 527 is codified at Health and Safety Code Sections 42400.4, 42801, 42810, 42821-42824, 42840-42843, 42860, 42870, 43021, 42410, 42801.1, 43023.

³ Senate Bill 375 is codified at Government Code Sections 65080, 65400, 65583, 65584.01, 65584.02, 65584.04, 65587, 65588, 14522.1, 14522.2, and 65080.01 as well as Public Resources Code Sections 21061.3, 21159.28, and Chapter 4.2.

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- Initiate California's first statewide climate change adaptation strategy that will assess the state's expected climate change impacts, identify where California is most vulnerable, and recommend climate adaptation policies by early 2009;
- Request the National Academy of Science establish an expert panel to report on sea level rise impacts in California to inform state planning and development efforts;
- Issue interim guidance to state agencies for how to plan for sea level rise in designated coastal and floodplain areas for new projects; and
- Initiate a report on critical existing and planned infrastructure projects vulnerable to sea level rise. This report was released in 2009 as the California Adaptation Strategy (CNRA 2009).

The Executive Order will provide consistency and clarify to state agencies on how to address sea level rise and other climate change related impacts in current planning efforts.

California Building Energy Efficiency Standards

Title 24, Part 6 of the California Code of Regulations, known as the Building Energy Efficiency Standards, was established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. On January 12, 2010, the California Building Standards Commission adopted CALGreen and became the first state in the United States to adopt a statewide green building standards code. CALGreen will require new buildings to reduce water consumption by 20 percent, divert 50 percent of construction waste from landfills, and install low pollutant-emitting materials.

4.14.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

Per **Appendix G** of the State CEQA Guidelines, air quality impacts are considered significant if implementation of the proposed project would:

- 1) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.
- 2) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

The State of California has identified 1990 GHG emission levels as a goal to be achieved by the year 2020 through adoption of AB 32. To meet GHG emission targets of AB 32, California would need to generate in the future less GHG emissions than current levels. It is recognized, however, that for most projects there is no simple metric available to determine if a single project would substantially increase or decrease overall GHG emission levels or conflict with the goals of AB 32. Moreover, emitting CO₂ into the atmosphere is not itself an adverse environmental effect. It is the increased concentration of CO₂ in the atmosphere resulting in global climate change and the associated consequences of climate change that results in adverse environmental effects (e.g., sea level rise, loss of snowpack, severe weather events). Although it is possible to generally estimate a project's incremental contribution of CO₂ into the atmosphere, it is typically not possible to determine whether or how an individual project's relatively small incremental contribution might translate into physical effects on the environment. Given the complex interactions between various global and regional-

scale physical, chemical, atmospheric, terrestrial, and aquatic systems that result in the physical expressions of global climate change, it is impossible to discern whether the presence or absence of CO₂ emitted by the project would result in any altered conditions.

However, the State of California has established GHG reduction targets and has determined that GHG emissions as they relate to global climate change are a source of adverse environmental impacts in California that should be addressed under the California Environmental Quality Act (CEQA). Although AB 32 did not amend CEQA, it identifies the myriad environmental problems in California caused by global warming (Health and Safety Code, Section 38501[a]). In response to the relative lack of guidance on addressing GHGs and climate change, SB 97 was passed in order to amend CEQA by directing the Governor's Office of Planning and Research (OPR) to prepare revisions to the State CEQA Guidelines addressing the mitigation of GHGs or their consequences. These revisions to the State CEQA Guidelines went into effect in January 2010. In acknowledging that perhaps the most difficult part of the climate change analysis will be the determination of significance, AB 32 requires CARB, the state agency charged with regulating statewide air quality, to recommend a method for setting thresholds which will encourage consistency and uniformity in the CEQA analysis of GHG emissions throughout the state. While CARB has published Recommended Approaches for Setting Interim Significance for Greenhouse Gases for project-level analysis, it has not yet completed this task for large-scale power plant projects at the time of this writing.

Under CEQA, an environmental impact report must identify and focus on the significant environmental effects of a project. Significant effect on the environment means a substantial, or potentially substantial, adverse change in the environment (Public Resources Code, Section 21068). CEQA further states that the CEQA Guidelines shall specify certain criteria to be used in determining whether projects would have a significant effect on the environment. However, as of the writing of this DEIR, the agencies with jurisdiction over air quality regulation and GHG emissions, such as the Imperial County Air Pollution Control District (ICAPCD), have not established a complete and adopted set of regulations, guidance, methodologies, significance thresholds, standards, or analysis protocols for the assessment of GHG emissions and climate change. A standardized, statewide methodology to establish an appropriate baseline, such as a project-level (regional GHG emissions) inventory, to evaluate the significance of GHG emission changes has not yet been established. This places the burden for establishing a methodology, and determining significance standards, on local lead agencies, such as Imperial County.

For the purposes of this DEIR, the County has decided to quantify total GHG emissions from the proposed project and compare this to the California Energy Commission's emission performance standard of 0.500 metric tons of CO₂ per megawatt-hour generated at the geothermal plant in order to determine significance. SB 1368, enacted in 2006, and regulations adopted by the California Energy Commission and the Public Utilities Commission pursuant to the bill, prohibits California utilities from entering into long-term commitments with any baseload facilities that exceed the emission performance standard of 0.500 metric tons CO₂ per megawatt-hour (1,100 pounds CO₂/MWh). Specifically, the SB 1368 emission performance standard applies to baseload power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more, including contracts with power plants located outside of California. If a project, in-state or out of state, plans to sell baseload⁴ electricity to a California utility, that utility will have to demonstrate that the project meets the emission performance standard.

⁴ Baseload units are defined as units that operate at a capacity factor higher than 60 percent.

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As a renewable electricity generating facility, the East Brawley Geothermal Development project will have to achieve compliance with the SB 1368 emission performance standard (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]) of emitting equal to or less than 0.500 metric tons of CO₂ per megawatt-hour projected to be generated at the facility to be consistent with AB 32 and a less than significant impact.

METHODOLOGY

The methodology utilized for the following analysis is based on a technical advisory released by the Governor's Office of Planning and Research (OPR) on June 19, 2008, titled *CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review*.

GHG emissions associated with proposed project were estimated for the GHGs that the California Air Resources Board finds are generated from sources like the proposed project: CO₂, N₂O, and CH₄. Calculations of GHG emissions typically focus on CO₂ because it is the most commonly produced GHG in terms of number of sources and volume generated and because it is among the easiest GHG to measure. This analysis augments the state of the practice by assessing N₂O and CH₄ emissions for other primary source categories of emissions (e.g., motor vehicles and energy use associated with long-term operation of the project), where possible. It is important to note that while other GHGs, such as HFCs, have a higher global warming potential than CO₂, they emit negligible emissions from land use developments like the proposed project under typical operations.

The Urban Emissions Model (URBEMIS) 2007 was utilized to estimate the annual CO₂ emissions occurring during power plant site construction activities and well site construction activities. The model evaluates both emissions occurring from construction equipment and activities and the emissions from worker commutes and vendor vehicles trips to and from the construction site.

IMPACTS AND MITIGATION MEASURES

Greenhouse Gas Emissions and Global Climate Change

Impact 4.14.1 Long-term operations of the project could result in a substantial net increase of CO₂e, either directly or indirectly generating greenhouse gas emissions, that may have a significant impact on the environment. This impact is considered to be **less than cumulatively considerable**.

The cumulative increase in GHG concentrations in the atmosphere has resulted in and will continue to result in increases in global average temperatures and associated shifts in climatic and environmental conditions. Multiple adverse environmental effects are attributable to global climate change, such as sea level rise, increased incidence and intensity of severe weather events (e.g., heavy rainfall, droughts), and extirpation or extinction of plant and wildlife species. Given the significant adverse environmental effects linked to global climate change induced by GHGs, a substantial increase in the emission of GHGs is considered a significant impact.

The proposed project has the potential to result in a substantial increase in the emission of GHGs from well drilling/testing, construction activities, generation of vehicle traffic, energy use, and the use of gasoline-powered landscaping equipment.

GHG Emissions from Site Construction

GHG construction emissions would occur over the entire period of power plant site preparation and construction. Well site construction would also occur during this same period and intermittently over the life of the project. Construction activities would be limited to an approximately 15-acre power plant site, and a total of 3 acres of construction would occur for each well site (i.e., 2 acres per well pad and 1 acre of associated access road). The operation of construction equipment and vehicles would emit greenhouse gases due to combustion of fossil fuels, mainly CO₂, N₂O, and CH₄. The principal GHG that is emitted from construction sources is CO₂. The amounts of N₂O and CH₄ emitted from construction equipment and vehicle operations are much lower and, in conformance with California Air Pollution Control Officer's Association guidance, are considered negligible for the purposes of this analysis (EMA 2011, p. 14).

The URBEMIS model developed for the South Coast Air Quality Management District was used to estimate the annual CO₂ emissions occurring during power plant site and Brawley Wastewater Treatment Plant (BWWTP) construction activities and well site construction activities. Based on the results of the URBEMIS modeled construction activities, approximately 2,774 metric tons of CO₂ would be released during power plant site and BWWTP construction activities, and 539 metric tons of CO₂ would be released during construction of 31 new well sites (93 acres). The total estimated emissions from power plant and well site construction activities are estimated to be approximately 3,313 metric tons of CO₂ over the life of the project.

GHG Emissions from Drilling and Testing

The principal source of GHG emissions that would occur during drilling operations would result from diesel fuel combustion to run the engines used by the drill rig. An estimated 205 metric tons of CO₂ would be released to run the large portable diesel engines used during the drilling of each well. Assuming that the five existing exploration wells will be integrated into the project, then a total of 31 additional wells will be drilled for the project. This would result in a total release of about 6,355 metric tons of CO₂ over the life of the project from geothermal well drilling operations.

During geothermal well tests, the wells would be produced into portable steel tanks from which noncondensable gas (NCG) in the geothermal fluid would be released to the atmosphere. The NCG predominantly comprises CO₂, with a tiny fraction of CH₄. It is estimated that the GHG emissions from well testing would total about 1.2 metric tons of CO₂e for each well tested, for a total of approximately 37 metric tons of CO₂e over the life of the project from geothermal well testing operations.

GHG Emissions from Power Plant Operations

The binary technology proposed for the East Brawley Geothermal Development project is not expected to release NCG to the atmosphere during power plant operations. However, if the NCG content of the geothermal fluid cannot be adequately removed by the well pad separators, up to 25 percent of the geothermal fluid NCG will be transported to the power plant. In that event, essentially all of the CO₂ in noncondensable gas delivered to the power plant site would be released to the atmosphere, along with a small additional amount of CO₂ and CH₄ generated during the combustion of NCG in the regenerative thermal oxidizer/scrubber unit. This would amount to a maximum potential release of up to about 113,200 metric tons per year and a lifetime emission amount of 3,396,000 metric tons of CO₂e for a worst-case 49.9-megawatt power generation facility.

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TABLE 4.14-2
TOTAL EMISSIONS GENERATED FROM PROPOSED PROJECT

Emissions Source	CO₂e (metric tons/life of project)
Site Construction ¹	3,313
Well Drilling and Testing ¹	6,392
Worst-Case Scenario Power Plant Operations per Year ¹	113,200
TOTAL annualized emissions (30 years)	113,523
Emissions per MWh Generated ²	0.2593
Annual Avoided Emissions from Renewable Energy Generation ³	-767,180
Net emissions ⁴	-653,657

Sources: 1 EMA 2011

² Based on an operating schedule of 24 hours/day, 365.5 days/year, the facility would produce 437,722 megawatt hours (MWh) of renewable electricity each year.

³ The avoided emissions scenario is a calculation of the facility electricity production in (2) if it were produced from non-renewable sources. CO₂, CH₄, and N₂O emission factors are from EPA's database eGRID for the WECC California subregion where the facility will be located.
http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2007V1_1_year05_SummaryTables.pdf.

⁴ The difference between annual emissions from site operation and construction and avoided emissions from renewable energy production.

As shown in **Table 4.14-2**, the proposed project would produce 0.2593 metric tons of CO₂ per megawatt-hour projected to be generated by the facility, which is below the California Energy Commission emission performance standard of 0.500 metric tons CO₂ per megawatt-hour generated. Furthermore, the annual avoided emissions from renewable energy generation of the proposed project would equal 767,180 metric tons of CO₂ over the life of the facility, for a net reduction of 653,657 metric tons. In other words, while the proposed geothermal facility would emit GHG emissions as a part of routine operations, the production of renewable energy that would be generated would result in avoided emissions and a net beneficial impact. GHG emissions for construction emissions and for project operations emissions would not result in a substantial net increase of CO₂e. The impact is **less than cumulatively considerable**.

Mitigation Measures

None required.

Conflict with Any Applicable Plan, Policy, or Regulation to Reduce Greenhouse Gas Emissions

Impact 4.14.2 The proposed project is required to be consistent with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases. This impact is considered **less than cumulatively considerable**.

The only adopted plan applicable to the project that reduces GHGs is the AB 32 Scoping Plan, which has identified 1990 emission levels as a goal to be achieved by the year 2020 through adoption of AB 32. Although implementation of AB 32 is currently delayed as a result of recent litigation, it is anticipated to move forward. To meet this goal, California would need to generate lower levels of GHG emissions than current levels. It is recognized that for most projects, there is

no simple metric available to determine if a single project would help or hinder meeting the AB 32 emission goals.

As discussed above, the proposed project has the potential to result in an increase in the emission of GHGs from construction activities, drilling operations, and general plant operations. However, as shown in **Table 4.14-2**, the proposed project would produce 0.2593 metric tons of CO₂ per megawatt-hour of energy produced at the facility, which is below the California Energy Commission emission performance standard of 0.500 metric tons CO₂ per megawatt-hour produced. Furthermore, the annual avoided emissions from renewable energy generation of the proposed project would equal 767,180 metric tons of CO₂ over the life of the facility, for a net reduction of 653,657 metric tons of avoided emissions. This impact to **less than cumulatively considerable**.

Mitigation Measures

None required.

4.14 CLIMATE CHANGE AND GREENHOUSE GASES

REFERENCES

California Natural Resources Agency (CNRA). 2009. *2009 California Climate Adaptation Strategy*.

Environmental Management Associates, Inc. (EMA). 2011. *East Brawley Geothermal Development Project, Air Quality Assessment*.

5.0 CUMULATIVE IMPACT ANALYSIS

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) is a cumulative impact analysis of the proposed East Brawley Geothermal Development project in addition to existing, approved, proposed, and reasonably foreseeable projects in the cumulative study area, as required by Section 15130 of the State CEQA Guidelines. The following discussion considers the cumulative impacts of the relevant environmental issue areas.

5.1 CEQA REQUIREMENTS FOR CUMULATIVE IMPACT ANALYSIS

This EIR analysis evaluates whether the overall long-term impacts of the proposed project would be cumulatively significant. Additionally, it determines if the proposed project would cause a cumulatively considerable contribution to any such cumulatively significant impacts (CEQA Guidelines Sections 15130[a]–[b], 15355[b], 15064[h], 15065[c]; *Communities for a Better Environment v. California Resources Agency* [2002] 103 Cal.App.4th 98, 120).

The California Environmental Quality Act (CEQA) requires that an environmental impact report (EIR) contain an assessment of the cumulative impacts that could be associated with the proposed project. According to CEQA Guidelines Section 15130(a), “an EIR shall discuss cumulative impacts of a project when the project’s incremental effect is cumulatively considerable.” “Cumulatively considerable” means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (as defined by Section 15130). As defined in CEQA Guidelines Section 15355, a cumulative impact consists of an impact that is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. A cumulative impact occurs from:

. . . the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

In addition, CEQA Guidelines Section 15130(b) identifies that the following three elements are necessary for an adequate cumulative analysis:

- 1) *Either:*
 - (A) *A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or*
 - (B) *A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.*
- 2) *A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available; and*
- 3) *A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable, feasible options for mitigating or avoiding the project’s contribution to any significant cumulative effects.*

5.0 CUMULATIVE IMPACT ANALYSIS

Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

5.2 CUMULATIVE ANALYSIS APPROACH

As stated above, the CEQA Guidelines require the use of a list of past, present, and probable future projects and/or the use of adopted projections from a general plan, other regional planning document, or a certified EIR for such a planning document. The "list" approach has been used in this DEIR. Some of the cumulative impacts associated with the proposed project are more localized in nature and thus are analyzed at a project level (e.g., noise). Other cumulative impacts are regional in nature and are therefore analyzed at a regional level rather than at a project level (e.g., greenhouse gas emissions and climate change). As such, these impacts are evaluated on a regional basis to analyze potential cumulative impacts.

The list of approved, proposed, and reasonably foreseeable projects used in this cumulative analysis is provided in **Table 4.0-1** in Section 4.0 of this DEIR. The list includes all applicable projects that have occurred or are planned or anticipated to occur within 3 miles of the City of Brawley as well as other alternative energy projects in the surrounding unincorporated area of Imperial County. Projects that may have a cumulative effect on the resources of this area are referred to as "related projects" in this cumulative impacts analysis.

5.3 ENVIRONMENTAL CONSEQUENCES, IMPACTS, AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

According to the CEQA Guidelines, **Appendix G**, the proposed project would be expected to result in a cumulative impact if the project would:

- Have impacts which are individually limited, but cumulatively considerable.

The CEQA Guidelines, Appendix G, further state, " 'Cumulatively considerable' means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects."

The above standard of significance was used in combination with the project standards of significance for each environmental issue area evaluated in this Draft EIR (see Sections 4.1 through 4.14) in the analysis provided below.

5.4 CUMULATIVE SETTING

Existing, approved, proposed, and reasonably foreseeable development in the City of Brawley and surrounding unincorporated area of Imperial County will contribute to cumulative impacts (see Section 4.0, Introduction to the Analysis and Assumptions Used). The projects listed in **Table 4.0-1** are known related projects that will contribute to intensification of development in the Brawley area. Please note that the list of projects provided in **Table 4.0-1** is not intended to be an all-inclusive list of activities in the area, but rather identification of large projects in the cumulative setting. The results of development in the area and continuation of existing land use and development patterns include increased land disturbance, increased runoff, increased water quality impacts, increased emissions and related air pollution, contributions to climate change, increased traffic, noise generation, impacts to habitat and wildlife, impacts to visual resources, impacts to cultural resources, and increased demand for public services and utilities (e.g., water supply, wastewater conveyance, treatment, and disposal, police and fire protection).

CUMULATIVE SETTING – AESTHETICS

The cumulative setting for visual resources/light and glare is the proposed, approved, and conceptual development anticipated in the Geothermal Overlay Zone area, approved by the County of Imperial, which calls out general and specific standards. Standards include preserving farm operations by minimizing surface land usage for geothermal exploration and facilities and by avoiding disruption to existing irrigation and drainage patterns; maintaining adequate setbacks from property lines, streets, and in particular, noise-sensitive land uses such as residences, schools, and hospitals;

Avoiding nuisance and unsightly conditions with appropriate limits on hours of operations, light control, and adequate fencing and landscaping; and establishing proper procedures for system shutdown and site abandonment. It is unlikely that development not already approved or anticipated by the General Plan would occur that would result in adverse aesthetic impacts, as the Geothermal Overlay Zone area was specifically created for such uses. Additionally, due to the lack of scenic highways, viewsheds, or other scenic resources in the area, a less than cumulatively considerable impact would occur.

CUMULATIVE SETTING – AGRICULTURAL RESOURCES

The setting for considering cumulative impacts to agricultural resources includes all active and inactive agricultural lands, including lands identified as having agricultural soils classifications, in Imperial County. Of the county's 4,597 square miles, or 2,942,080 acres, approximately 20 percent of the land is irrigated for agricultural purposes, particularly in the central area known as Imperial Valley. Two other major irrigated areas are Bard Valley in the southeast corner of the county and Palo Verde Valley in the northeast corner.

The cumulative setting for agricultural resources includes buildout anticipated in the Imperial County General Plan as well as existing, approved, and reasonably foreseeable projects as described in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this Draft EIR. Buildout under the general plans of cities in the county, including the cities of Imperial to the south and Brawley to the north, would also contribute to cumulative development. **Table 4.0-1** in Section 4.0 identifies and describes projects that, along with the proposed project, could contribute incrementally to cumulative agricultural impacts through the conversion of agricultural land to nonagricultural uses. Under cumulative conditions, it is anticipated that the county would continue to have agricultural operations and land designated for agricultural use.

CUMULATIVE SETTING – AIR QUALITY

The cumulative setting for air quality is the Salton Sea Air Basin (SSAB), which consists of all of Imperial County and a portion of Riverside County, including existing, approved, proposed, and reasonably foreseeable development within the air basin. Regional air quality in the SSAB is affected by topography and atmospheric inversions. The area is generally very flat and bordered to the west by the Peninsular Mountain range and to the east by the Chocolate, Orocopia, and Cargo Muchacho mountains. The prevailing winds tend to come from the west-northwest through southwest. The mountains to the east act as physical barriers to the dispersion of airborne contaminants. At current levels of development and activity, the air basin exceeds the state and federal ambient standards for PM₁₀ and ozone. Cumulative growth in Imperial County and the SSAB would increase population, vehicle use, and industrial activity, which could inhibit efforts to improve regional air quality and attain ambient air quality standards.

5.0 CUMULATIVE IMPACT ANALYSIS

CUMULATIVE SETTING – BIOLOGICAL RESOURCES

The cumulative setting includes the areas containing biological resources in the Imperial County region. Development anticipated as part of the cumulative condition is illustrated in **Figure 4.0-1** and referenced in the pending and proposed projects listed in **Table 4.0-1** in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used.

Future proposed and planned development would change the intensity of land uses in the surrounding area, which may result in biological and natural resources impacts, including loss of natural habitats and associated species. The cumulative impact analysis herein focuses on the proposed project's contribution to cumulative impacts and whether that contribution is considered cumulatively considerable.

CUMULATIVE SETTING – CULTURAL RESOURCES

The cumulative setting associated with the East Brawley Geothermal Development project includes proposed, planned, reasonably foreseeable, and approved projects and development in Imperial County and the southern California deserts as described in Sections 4.0 and 5.0 of this Draft EIR. Developments and planned land uses in the region could contribute to potential conflicts with cultural and paleontological resources. These resources include archaeological resources associated with Native American activities and historic resources associated with settlement, farming, and economic development.

CUMULATIVE SETTING – GEOLOGY AND SOILS

Impacts associated with geology and soils generally are site-specific (determined by a particular site's soil characteristics, topography, and proposed land uses) rather than cumulative in nature. However, surficial deposits, namely erosion and sediment deposition, can be cumulative in nature, depending on the type and amount of development proposed in a given geographical area.

The cumulative setting for soil erosion consists of existing, planned, proposed, and reasonably foreseeable land use conditions in the region (see Section 4.0 for a description of the cumulative setting). However, construction constraints are primarily based on specific sites within a proposed development and on the soil characteristics and topography of each site. As discussed throughout this section, all new development must comply with the California Building Code, the applicant must submit a geotechnical report which contains construction and design guidelines and site-specific recommendations to reduce potential seismic, geologic, and soil-related hazards. The reader is referred to Section 4.8, Hydrology and Water Quality, regarding cumulative water quality impacts from soil erosion.

CUMULATIVE SETTING – HAZARDOUS MATERIALS AND PUBLIC HEALTH

The cumulative setting for hazards associated with the proposed project includes proposed, planned, approved, or reasonably foreseeable projects in Imperial County, including the list of projects in **Table 4.0-1** in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this DEIR. The cumulative setting also includes the existing uses. In the case of an accident, the Imperial County Fire Department/Office of Emergency Services indicated that the likely effect of the proposed project would be to increase response times due to the potential for simultaneous calls.

CUMULATIVE SETTING – HYDROLOGY AND WATER QUALITY

The cumulative hydrology and water quality setting for the project is the Imperial Valley Planning Area of the East Colorado Basin Plan. Buildout of the project site and surrounding area, which includes the projects listed in **Table 4.0-1** in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this Draft EIR, would result in the construction of additional impervious surfaces that would change drainage patterns, reduce water absorption, and increase surface runoff. This development would also increase water demand from the Imperial Irrigation District (IID) and reduced water inflow to the New River and the Salton Sea. The estimated water demand of each of these projects is listed in **Table 4.8-2**, which shows the total water demand of the cumulative projects are estimated at 13,788.5 acre-feet per year.

CUMULATIVE SETTING – LAND USE AND PLANNING

The cumulative setting for land use impacts is Imperial County and the nearby City of Brawley. Cumulative development includes buildout of the Imperial County General Plan as well as any existing, approved, proposed, and reasonably foreseeable development within the cumulative study area, as described in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this DEIR. The cumulative impact analysis herein focuses on the proposed project's contribution to cumulative land use impacts and whether that contribution is considered considerable.

CUMULATIVE SETTING – NOISE

The cumulative setting for noise includes development surrounding the project site. A list of cumulative projects that were included as part of the assumptions used in developing the baseline cumulative conditions is included in **Table 4.0-1** in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this DEIR. Future cumulative noise levels in the vicinity of the project site would be primarily influenced by vehicle traffic along area roadways.

CUMULATIVE SETTING – PUBLIC SERVICES

Fire Protection Services

The cumulative setting for fire protection is the service area of the Imperial County Fire Department, which includes residential and nonresidential development in the unincorporated areas of the county. The cumulative conditions for fire protection include existing, approved, proposed, and other development anticipated in the unincorporated county. Under cumulative conditions, the fire department would continue to provide fire protection services to Imperial County, including the project site. Currently, several projects are approved or under application with the County. In addition to the East Brawley Geothermal Development project, several projects are proposed in the vicinity of the project site. **Table 4.0-1** in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, provides a list of these projects.

Law Enforcement Services

The cumulative setting for law enforcement would be the service area of the Imperial County Sheriff's Department, which includes incorporated cities and unincorporated areas. The cumulative conditions for police protection include existing, approved, proposed, and other development anticipated in the Imperial County General Plan and the service area for the Imperial County Sheriff's Department. Under cumulative conditions, the Sheriff's Department

5.0 CUMULATIVE IMPACT ANALYSIS

would continue to provide law enforcement services to Imperial County, including the project site. The projected development in the county would increase both the resident population and the number of nonresidential structures requiring law enforcement protection. Currently, several projects are approved or under application with the County. In addition to the proposed East Brawley Geothermal Development project, several projects are proposed in the vicinity of the project site. **Table 4.0-1** in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, provides a list of these projects.

Solid Waste Services

Growth in the community increases the amount of waste generated and disposed. The cumulative setting for solid waste services would be the service area of Allied Waste, which includes the entire unincorporated area of the Imperial Valley and Borrego Springs. Under cumulative conditions, buildout anticipated under the Imperial County General Plan, as well as planned and proposed development, would result in additional solid waste generation. Under cumulative conditions, Imperial County would continue to see increased solid waste in all disposal facilities. The projected development in the county would include construction of additional industrial facilities and structures requiring solid waste disposal services.

CUMULATIVE SETTING – TRANSPORTATION AND CIRCULATION

The cumulative setting for transportation and circulation impacts is Imperial County and the nearby City of Brawley. Cumulative development includes buildout of the Imperial County General Plan as well as any existing, approved, proposed, and reasonably foreseeable development within the cumulative study area, as described in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this DEIR. The cumulative impact analysis herein focuses on the proposed project's contribution to cumulative transportation and circulation impacts and whether that contribution is considered considerable.

CUMULATIVE SETTING – UTILITIES

The cumulative setting for electrical, natural gas, and telephone services impacts is Imperial County and the nearby City of Brawley. Cumulative development includes buildout of the Imperial County General Plan as well as any existing, approved, proposed, and reasonably foreseeable development within the cumulative study area, as described in Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, of this DEIR. The cumulative impact analysis herein focuses on the proposed project's contribution to cumulative electrical, natural gas, and telephone services impacts and whether that contribution is considered considerable.

CUMULATIVE SETTING – CLIMATE CHANGE AND GREENHOUSE GASES

The cumulative setting for climate change and greenhouse gases could be considered the entirety of the earth, but in order to quantify the greenhouse gases associated with the proposed project, cumulative development includes the State of California and the California Energy Commission's Emission Performance Standard of 0.500 metric tons of CO₂ per megawatt-hour generated at the geothermal plant, in order to quantify emissions.

5.5 CUMULATIVE IMPACT ANALYSIS

Identified below is a compilation of the cumulative impacts associated with implementation of the proposed project in combination with existing, approved, proposed, and reasonably foreseeable development in the City of Brawley and surrounding unincorporated area of Imperial County.

AESTHETICS

Cumulative Impact to Aesthetics

Impact 4.1.4 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would alter the visual character of the area resulting in a change to public views as well as increased nighttime light and daytime glare levels. This is considered to be a **less than cumulatively considerable** impact.

Future development in the Geothermal-Transmission Element area would result in future alteration of the existing landscape. Project-related increases in light and glare in the area could potentially result in adverse cumulative impacts in combination with other proposed projects. The proposed East Brawley Geothermal Development project's location is within the Geothermal Overlay Zone area designated for the development of geothermal exploration uses and surrounded by active agricultural land. It is unlikely that additional considerable increased development would occur that would result in adverse aesthetic impacts not already addressed in the General Plan, because the proposed project is located in an agriculturally designated area, with minimal urban development. Additionally, there are no sensitive viewers in the vicinity of the project site and existing views are of low visual quality. The proposed development would be compatible with existing and projected land uses in the surrounding area; therefore, visual impacts would be **less than cumulatively considerable**.

Mitigation Measures

None required.

AGRICULTURAL RESOURCES

Cumulative Impact to Agricultural Resources

Impact 4.2.2 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could result in impacts to agricultural resources. This would be a **less than cumulative considerable** impact.

Table 4.0-1 identifies existing, proposed, and reasonably foreseeable projects in the county that have converted or could result in the conversion of farmland to nonagricultural uses.

As discussed under the analysis of Impact 4.2.1, the proposed project is consistent with County of Imperial General Plan Policy #1, which allows geothermal projects to occur in areas that are designated farmland. The remaining property which is under active agricultural production (2,844.5 acres) will remain unchanged. The disturbed lands, except for possibly the power plant site, would be returned to agricultural use once the wells are abandoned, the pipelines removed, and the well pads reclaimed. As such, the project would temporarily convert portions of the project site to nonagricultural use. Therefore, the proposed project will result in the minimal temporary loss of farmland, 14.6 acres of Prime Farmland, 64.6 acres of Farmland of Statewide Importance, and 2.2 acres of Unique Farmland (refer to **Figure 4.2-1**), because the pipeline portions of the site would be temporarily converted from active agricultural lands (if they are active).

The proposed project is in compliance with General Plan EIR policies and mitigation measures. However, the project would still result in the conversion of Prime Farmland and Farmland of

5.0 CUMULATIVE IMPACT ANALYSIS

Statewide Importance to nonagricultural uses (79.2 acres). This conversion would result in an incremental contribution to the overall loss of agricultural lands in Imperial County. Once farmland is used for urban development, it is essentially lost as an agricultural resource. Because no new agricultural land can be created to replace lost agricultural lands, no mitigation exists to fully offset the loss of agricultural lands. Therefore, the proposed project, in combination with the development of other existing, proposed, and reasonably foreseeable projects in the county, would result in a loss of agricultural resources, which could be considered a cumulatively considerable impact. Due to the anticipated conversion of some agricultural lands to geothermal uses, and because the proposed project is consistent with the County's land use designation of A-2-G, the conversion of agricultural land for geothermal use was anticipated by the County during the development of the General Plan. Impacts to the loss of agricultural land are considered **less than cumulatively considerable**. Also, because the disturbed lands would be returned to agricultural use and the proposed project does not propose a substantial acreage of prime farmland that would impair existing and future agricultural operations, impacts to the loss of agricultural land are considered **less than cumulatively considerable**.

Mitigation Measures

None required.

AIR QUALITY

Cumulative Impact to Air Quality

Impact 4.3.7 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would contribute to increased air quality emissions in the air basin. This is considered a **potentially cumulatively considerable** impact.

As discussed under Impact 4.3.3, the project would result in an increase of regulated air pollutants associated with ozone or PM₁₀ in excess of 137 pounds per day. As depicted in **Table 4.2-7**, the power plant would emit 29.64 tons per year (161 pounds per day) of ROCs, which is in excess of 137 pounds per day, so offsets would be required for these excess project emissions at a rate of 1.2 to 1.0. Mitigation measure **MM 4.3.3a** mandates the implementation of a regenerative thermal oxidizer (RTO) unit and caustic scrubber system as well as a maintenance vapor recovery unit to limit OEC unit emissions as part of the proposed project. The RTO unit would remove by thermal oxidation essentially all of the ammonia and a minimum of 98 percent of the methane (CH₄), benzene (C₆H₆), and hydrogen sulfide (H₂S) in the geothermal NCG delivered to the RTO unit. Mitigation measure **MM 4.3.3b** requires the proposed project to fulfill its obligations mandated in ICAPCD Rule 207.C.2.a in order to mitigate project air pollutants associated with ozone or PM₁₀ in excess of 137 pounds per day with the purchase of necessary ROC emission offset credits from one or more entities. Implementation of mitigation measure **MM 4.3.3b** would reduce the net emissions of ROCs in the Salton Sea Air Basin.

As discussed under Impact 4.3.5, without the proposed RTO/scrubber emission abatement, the proposed project has the potential to emit more than 10 tons per year of the HAP benzene. Pursuant to Rule 900 of ICAPCD, the project would be considered a major stationary source unless the abatement of benzene is federally enforceable. This impact would be **less than cumulatively considerable with mitigation**.

Mitigation Measures

No additional mitigation is required. Implementation of mitigation measure **MM 4.3.5** mandates the achievement of synthetic minor source status in order to mitigate project air pollutants associated with benzene (prior to the issuance of construction permits). Therefore, the proposed project's cumulative impact to air quality from operational emissions is considered **less than cumulatively considerable**.

BIOLOGICAL RESOURCES

Cumulative Impact to Special-Status and Sensitive Species

Impact 4.4.8 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in potential disturbance to special-status species and sensitive habitats throughout the region. This impact is considered **potentially cumulatively considerable**.

The agricultural community within the proposed project study area represents only a small portion of the habitat available for special-status wildlife species, including migratory birds. Implementation of the proposed project may result in degradation of wildlife habitat through a variety of actions which, when combined with other habitat impacts occurring from development in surrounding areas, would result in cumulatively considerable impacts. However, potential impacts associated with the proposed project are minimal considering the developed/disturbed nature of the study area. While it is unlikely that any remaining natural habitats within the project vicinity would be impacted, future development within the surrounding vicinity would have an unknown and unquantifiable impact on special-status species, biologically sensitive habitats, and potentially jurisdictional wetlands and waters of the U.S. Furthermore, increased development and disturbance created by human activities (e.g., fires, increased nighttime lighting) would result in direct mortality, habitat loss, and deterioration of habitat suitability. As the proposed project may contribute incrementally to these effects, the impact is considered cumulatively considerable.

In addition, as discussed under Impact 4.8.5 in Section 4.8, Hydrology and Water Quality, the proposed project would contribute to a cumulative diversion of water from the Salton Sea, which provides habitat for numerous wildlife species including special-status fish and migratory birds. However, this cumulative diversion was determined to result in a negligible reduction in the sea's average surface water elevation and salinity. As such, there would be a less than cumulatively considerable impact on the special-status plant and wildlife species that inhabit the Salton Sea as well as the habitat provided by its waters and shoreline.

Mitigation Measures

No additional mitigation is required. Mitigation measures **MM 4.4.1** through **MM 4.4.5** provide mitigation requirements addressing biological resources. The mitigation measures assist in reducing significant impacts to cumulative biological resources. Therefore, cumulative impacts related to biological resources would be reduced to **less than cumulatively considerable**.

5.0 CUMULATIVE IMPACT ANALYSIS

CULTURAL RESOURCES

Cumulative Impact to Prehistoric Resources, Historic Resources, and Human Remains

Impact 4.5.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could result in impacts to prehistoric resources, historic resources, and human remains. This impact is considered **potentially cumulatively considerable**.

Cumulative development in the region could result in the loss and/or degradation of cultural resources. The potential disturbance of human remains could also increase. These cumulative effects of development on cultural resources would be significant. As discussed under Impact 4.5.1, current archaeological and historical investigations for the project did not identify any prehistoric or historic resources or human remains within project boundaries. Regardless, there is the potential for the proposed project to uncover previously undiscovered cultural resources because of the area's historic occupation by Native Americans. The project's potential to contribute to the loss of these resources is cumulatively considerable.

Mitigation Measures

No additional mitigation is required. Mitigation measures **MM 4.5.1a** and **MM 4.5.1b** provide mitigation requirements addressing historic and prehistoric resource-related impacts. The mitigation measures assist in reducing significant impacts to known and unknown prehistoric and historic resources and human remains. Therefore, cumulative impacts related to prehistoric and historic cultural resources and human remains would be reduced to **less than cumulatively considerable**.

Cumulative Impact to Paleontological Resources

Impact 4.5.4 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could result in the potential disturbance of paleontological resources (i.e., fossils and fossil formations). This impact is considered **potentially cumulatively considerable**.

Cumulative development in the region could result in the loss and/or degradation of paleontological resources. These cumulative effects of development on paleontological resources could be significant. As discussed under Impact 4.5.2, there are no known paleontological resources on the project site. However, due to the previous discovery of paleontological resources in Imperial County, there is the potential for paleontological resources to be discovered during construction of a project site. The proposed project's potential to contribute to the loss of these resources is cumulatively considerable.

Mitigation Measures

No additional mitigation is required. Mitigation measure **MM 4.5.2** provides mitigation requirements addressing paleontological resource-related impacts. Implementation of Imperial County General Plan policies and compliance with **MM 4.5.2** would assist in reducing significant impacts to known and unknown paleontological resources. Therefore, cumulative impacts related to paleontological resources would be reduced to **less than cumulatively considerable**.

GEOLOGY AND SOILS

Cumulative Geology and Soils Impact

Impact 4.6.8 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in continued urbanization of the area by increasing the density of development. This impact is considered **potentially cumulatively considerable**.

Cumulative development of planned and proposed projects in Imperial County is not anticipated to result in cumulative issues associated with geology and soils. Risks associated with seismic events and soil conditions, such as liquefaction, would be site-specific and are not anticipated to increase on a cumulative level.

Impacts regarding erosion and sediment deposition can be cumulative in nature if affecting a watershed. Impacts to water quality are addressed in Section 4.8, Hydrology and Water Quality. Buildout of approved and planned uses in the county have the potential to impact water quality. However, individual projects are required to comply with applicable codes, standards, and permitting requirements (e.g., preparation of a SWPPP) to mitigate erosion impacts. Development of the project site has the potential to contribute to soil erosion and loss of topsoil during construction. These potential impacts would be mitigated through the implementation of the SWPPP and BMPs. In addition, dust suppression measures in the ICAPCD CEQA Air Quality Handbook are included as part of mitigation measure **MM 4.3.2a** in Section 4.3, Air Quality, to reduce airborne pollutants. Impacts associated with erosion are mitigated on a project-by-project basis, which would reduce the overall cumulative impact to a less than significant level.

Due to the topography of the project vicinity, the proposed project is not susceptible to impacts associated with land sliding or lateral spreading. Therefore, there are no potentially cumulatively considerable impacts associated with the proposed project.

The project site is located in a seismically active area. The proposed project would not result in significant unavoidable impacts related to geology, soils, and seismicity, with the implementation of applicable mitigation measures. Furthermore, geology, soils, and seismicity impacts are site-specific and, at minimum, development of each individual project site is required to comply with County standards as well as applicable state codes and the CBC for Seismic Zone 4. Impacts resulting from ground shaking are reduced to a less than significant level through required compliance with the provisions of the California Building Standards, the CBC, and other applicable local and state building codes and seismic regulations. Also, site-specific geotechnical investigations performed by a qualified professional would further reduce the potential for structural damage to facilities. Mitigation measures outlined in this section, including densification of subsurface soils, selective grading, chemically treating soil, and implementing a SWPPP and BMPs, will all reduce the potential impacts discussed. Mitigation measures cited in **MM 4.6.6** will mitigate potential impacts from expansive soils. For these reasons, the proposed project is not anticipated to contribute to cumulative significant impacts related to geology and soils. Therefore, cumulative geological and soil-related impacts are considered less than cumulatively considerable.

Mitigation Measures

No additional mitigation is required. Implementation of mitigation measures **MM 4.6.2** and **MM 4.6.6** would ensure that potential impacts relating to geology and soils would be **less than cumulatively considerable**.

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HAZARDOUS MATERIALS AND PUBLIC HEALTH

Cumulative Hazardous Materials and Public Health Impact

Impact 4.7.7 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could increase the risk of public exposure to hazardous materials. This is considered a **less than cumulatively considerable** impact.

The cumulative effects from ongoing development in the project area could create a risk to public health associated with exposure to hazardous materials (chemicals, herbicides, etc.). Impacts associated with hazardous materials are generally site-specific, and each individual project is responsible for mitigating its specific risks. As discussed under Impact 4.7.1, the project site would be required to prepare an ERP for geothermal power plant facility operations. Additionally, the project applicant would be required to pay fees that would offset the project's impacts for increased demand for fire and emergency services as determined appropriate by the Imperial County Fire Department (mitigation measure **MM 4.11.1-2**).

Mitigation Measures

No additional mitigation is required.

HYDROLOGY AND WATER QUALITY

Impact 4.8.5 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would contribute to the cumulative effects of degradation of water quality, changes to runoff patterns, and the potential for increased flooding. This impact is considered **potentially cumulatively considerable**.

Surface waters in the Imperial Valley ultimately drain into the Salton Sea via the New and Alamo rivers as well as via irrigation drains and canals. Until recently, the amount of water entering the Salton Sea was roughly balanced by the amount of water evaporating from its surface. However, due to increased demand for water supplies in the region and recent IID water transfer agreements (see Section 4.13); increasing amounts of water are being consumed in Imperial Valley as well as transferred out of the valley to population centers such as San Diego County, thus reducing inflows to the Salton Sea. Implementation of the proposed project and the projects listed in **Table 4.0-1** would contribute to this cumulative diversion of water from the Salton Sea. This would occur both through the consumption of IID water supplies and through the conversion of irrigated agricultural land that previously drained to the sea.

Agricultural runoff contributes significantly to total inflows to the Salton Sea. As irrigated agricultural land is converted to nonagricultural use, the associated runoff ceases to drain into the New and Alamo rivers, ultimately reducing the sea's total inflows. As described in Section 4.2, Agricultural Resources, the proposed project will convert approximately 188.75 acres of active farmland. According to Department of Water Resources data (1997), the projects listed in **Table 4.0-1** contain a total of approximately 1,591 acres of irrigated agricultural land. Based on the assumption that an average acre of agricultural land uses 5.25 acre-feet per year¹ and assuming a worst-case scenario in which implementation of these projects results in the

¹ 2009 apportionment for water users that have eligible farmable cropland.

conversion of the entire 1,780 acres ($1,591 + 188.75 = 1,780$), the proposed project in combination with other planned projects in the cumulative area would divert approximately 9,344 acre-feet per year from the Salton Sea.

Currently, about 1.3 million acre-feet flow into the Salton Sea each year and 80 percent of this total comes from Imperial Valley. As shown in **Table 4.8-2**, these projects would have a total water demand of 13,788.5 acre-feet per year. In addition, as described above, these projects could divert an additional 9,344 acre-feet per year through the conversion of irrigated agricultural land. Therefore, the proposed project in combination with other planned projects in the cumulative area could divert up to 23,132.5 acre-feet per year ($13,788.5 + 9,344 = 23,132.5$) from the Salton Sea. This amount represents 3 percent of the sea's current total inflows. Furthermore, given a total surface area of 376 square miles and a total volume of 7.5 million acre-feet, the diversion of 23,132.5 acre-feet per year is estimated to reduce the surface elevation of the Salton Sea by 1.2 inches. In comparison, the Salton Sea surface elevation fluctuates annually by approximately 12 inches, reaching its maximum annual elevation between March and June and its minimum elevation between October and November as a result of irrigation practices. Given this seasonal fluctuation, a drop in surface elevation of 1.2 inches is considered to be negligible and would not result in significant impacts on habitat areas.

Implementation of the proposed project in combination with the projects listed above would result in a negligible contribution to the decline in the Salton Sea's surface elevation and volume and, accordingly, a negligible effect on its salinity level. Therefore, the proposed project's contribution to this cumulative impact is considered to be **less than cumulatively considerable with mitigation**.

Furthermore, implementation of the proposed project would contribute to the cumulative effects of degradation of water quality, changes to runoff patterns, and the potential for increased flooding. However, the project's contribution would be minimized through project design, including retention basins and required mitigation measures. Additionally, the project would comply with the applicable NPDES permits. NPDES permits were created to address regional, cumulative water quality impacts from all existing and proposed development to the maximum extent feasible.

Mitigation Measures

No additional mitigation is required. Mitigation measures **MM 4.8.1** and **MM 4.8.2**, in addition to the proposed project's drainage features, would ensure that the project's contribution to cumulative water quality impacts would remain **less than cumulatively considerable**.

LAND USE AND PLANNING

Cumulative Land Use Compatibility Impact

Impact 4.9.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in development that would change existing land uses patterns and intensity. This impact is considered **less than cumulatively considerable**.

Continued development in Imperial County would result in increased urbanization, including the density of residential, commercial, office, recreational, and public uses. Under cumulative conditions, conflicts between land uses may occur. Generally, land use conflicts would be related to noise, traffic, air quality, and hazards/human health and safety issues, which are discussed in the

5.0 CUMULATIVE IMPACT ANALYSIS

relevant sections of the Draft EIR. Land use conflicts are site-specific and would not result in a cumulative impact. Cumulative incompatibility issues are anticipated to be generally addressed and mitigated on a project-by-project basis. The cumulative environmental effects of development of the project site and surrounding area are addressed in the technical sections of this DEIR (Sections 4.1 through 4.14). This impact is considered **less than cumulatively considerable**.

Mitigation Measures

None required.

NOISE

Cumulative Project-Generated Noise Impact

Impact 4.10.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase ambient noise but would not exceed the 3 dBA threshold. Therefore, this impact is considered **less than cumulatively considerable**.

The proposed project is predicted to create a total of 84 average daily trips on the region's roadways. This small number of vehicles would not lead to an increase in ambient noise levels adjacent to the project site or in the region.

As described in Impact 4.10.2, the proposed project's operational contributions to the ambient noise levels are considered less than significant for the immediate surrounding sensitive receptors. Therefore, the contribution to cumulative noise levels would be **less than cumulatively considerable**.

Mitigation Measures

None required.

PUBLIC SERVICES

Cumulative Impact to Fire Protection Services

Impact 4.11.1.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase demand for fire and emergency medical services. This impact is considered **potentially cumulatively considerable**.

The proposed project would incrementally increase demand for fire protection services in unincorporated Imperial County. Moreover, the proposed project would result in placement of a geothermal plant in a portion of the county that was previously undeveloped. The County of Imperial Service Area Plan states that as development continues to occur, response times may increase due to the potential for simultaneous calls. Therefore, the proposed project's contribution to the demand for fire and emergency medical services would be **potentially cumulatively considerable**. The project applicant will be required to pay development impact fees in accordance with Ordinance 1418. In addition, the project applicant will be required to discuss possible contributions for additional fire equipment and staff with the Imperial County Fire Department (**MM 4.11.1.2**) and a Hazardous Materials Business Plan (**MM 4.7.1a**) and an Emergency Response Plan (**MM 4.7.1b**). The project applicant will be required to pay for

additional fire equipment, and staff, as determined appropriate by the Imperial County Fire Department (MM 4.11.1.2).

The proposed project is also required to comply with the requirements of CFC 2007 and includes a variety of design features (automatic fire suppression system, deluge sprinkler system) to prevent and suppress fire.

Mitigation Measures

No additional mitigation is required. Implementation of mitigation measures MM 4.7.1a, MM 4.7.1b and MM 4.11.1.2 would ensure that potential cumulative impacts relating to fire and emergency medical services would be **less than cumulatively considerable**.

Cumulative Impact to Law Enforcement Services

Impact 4.11.2.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase demand for law enforcement services. This impact is considered **less than cumulatively considerable**.

The proposed project would result in a slight incremental increase in demand for law enforcement services in unincorporated Imperial County. The project would result in placement of a geothermal plant in a portion of the county that was previously undeveloped. However, based on the nature of the project, demand for law enforcement would not dramatically increase. Overall increases in development in the county may result in increased demand for law enforcement services under cumulative conditions. The County of Imperial Service Area Plan states that as development continues to occur, response times may increase due to the potential for simultaneous calls. Therefore, the proposed project's contribution to the demand for law enforcement services would be potentially cumulatively considerable. However, the proposed project, as well as all other development occurring in the county, would be required to pay development impact fees in accordance with Ordinance 1418 for the Sheriff's Department. These fees would be used to supplement the fair share of the costs of equipment and services necessitated by each individual development project. Therefore, impacts would be mitigated on a project-by-project basis. Overall, the proposed project's contribution to law enforcement services would be mitigated to **less than cumulatively considerable**.

Mitigation Measures

None required.

Cumulative Impact to Solid Waste Services

Impact 4.11.3.2 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase solid waste generation and demand for landfill capacity. However, Imperial County has implemented its Countywide Integrated Waste Management Plan, and adequate capacity is available at landfills that serve the county. Therefore, this impact is considered **less than cumulatively considerable**.

Cumulative development in Imperial County and the service area of Allied Waste would generate an additional demand on solid waste services. As described in the setting, as well as under Impact 4.12.3.1, the project is not anticipated to adversely impact landfill capacity. The

5.0 CUMULATIVE IMPACT ANALYSIS

Allied Imperial Landfill will be adding 20 years of capacity. Furthermore, seven other solid waste disposal sites in Imperial County are active and have remaining capacity. The County has also implemented a Countywide Integrated Waste Management Plan (CIWMP) to address source reduction across all sectors (residential, industrial, commercial). Therefore, the proposed project's contribution to cumulative demand for landfill capacity would be **less than cumulatively considerable**.

Mitigation Measures

None required.

TRANSPORTATION AND CIRCULATION

Impact 4.12.5 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in increased traffic volumes that are not expected to result in increased delays or deterioration of levels of service at area intersections or roadway segments. This impact is considered to be **less than cumulatively considerable**.

As noted in **Tables 4.12-6**, buildout of the proposed project would result in 84 ADT, which would not lead to a decrease in LOS for the project intersections and street segment operations. Therefore, due to the minimal number of ADT for the proposed project and the lack of additional cumulative projects in the area (refer to **Figure 4.0-1**), the project, in combination with other proposed and approved cumulative projects in the vicinity, under the cumulative condition would result in a **less than cumulatively considerable** impact.

Mitigation Measures

None required.

UTILITIES

Cumulative Impact to Water Supply

Impact 4.13.1.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase demand for water from IID. However, IID will have sufficient water supplies from existing entitlements to serve future growth. This impact is considered **less than cumulatively considerable**.

The proposed project would have a total water demand of 5,500 acre-feet per year, which would be obtained entirely from IID until the proposed upgrades to the Brawley Wastewater Treatment Plant are completed (anticipated in 2014). Following completion of these upgrades, the project will obtain most of its water demand (4,369 AFY) from the outflow of the BWWTP. The project will continue to purchase the remaining demand (1,131 AFY) from IID. However, based on population projections for Brawley, it is estimated that the outflow of the BWWTP will be sufficient to meet project demand within approximately 10 years, at which point no water would be required from IID.

IID's IWSP designates 25,000 AFY for nonagricultural uses. Most of this water has not yet been allocated and will be available for the proposed project. The Final IWRMP is anticipated to increase the amount designated for nonagricultural projects to 50,000 AFY when adopted in

order to meet projected future demands. As discussed under Impact 4.13.1.2, IID has adequate policies, programs, and projects in place to provide water to its users for 20 years, during both normal and single dry years. Additionally, IID's Equitable Distribution Plan is sufficient to manage water supply during multiple dry years. Furthermore, IID is currently developing an Integrated Water Resources Management Plan (IWRMP) that will identify and recommend potential programs and projects to develop new water supplies and new storage, and enhance the reliability of existing supplies in order to maintain service levels as water demands increase in the future. Nonagricultural projects will be charged a water supply development fee in order to fund implementation of the IWRMP and related water supply projects.

As IID has sufficient existing supplies and entitlements to serve anticipated nonagricultural projects in the future, including the proposed project, this impact is considered **less than cumulatively considerable**.

Mitigation Measures

None required.

Cumulative Impact to Wastewater Services

Impact 4.13.2.2 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, could increase demand for wastewater treatment services. This impact is considered **less than cumulatively considerable**.

The proposed project will inject all water associated with plant operations (e.g., geothermal brine and cooling tower blowdown) back into the geothermal reservoir. All wastewater associated with employees and general operation of the control room, office, and maintenance shop would be treated via a private, on-site septic system. The proposed system, and all other future wastewater systems in the county, would be required to adhere to all state, regional, and local regulations and ordinances regarding wastewater discharge, including a permit from the Imperial County Public Health Department, Section of Environmental Health and Consumer Protection Services.

Because the proposed project would be required to adhere to all state, regional, and local regulations and ordinances regarding wastewater discharge, regional water quality would not be significantly impacted from wastewater disposal. Consequently, there are no projects that would, in combination with the proposed project, result in any significant impact related to wastewater treatment. Therefore, cumulative impacts would be **less than cumulatively considerable**.

Mitigation Measures

None required.

Cumulative Impact to Electric Services

Impact 4.13.3.3 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would increase demand for electric service. However, the proposed project would not require improvements to IID Energy's distribution system and would not contribute significantly to this cumulative impact. This impact is considered **less than cumulatively considerable**.

5.0 CUMULATIVE IMPACT ANALYSIS

As described under Impact 4.13.3.1, the project site is currently provided electrical service by IID Energy, and existing distribution infrastructure is present on and adjacent to the project site. The proposed project would not have significant demand for electricity and would not require the extension or expansion of distribution infrastructure. Furthermore, once operational, the proposed project would generate approximately 49.9 net megawatts of electricity per year from a renewal source and would be considered a beneficial effect on regional electrical generation and use. The proposed project would not significantly contribute to the cumulative increase in demand for electrical service. This impact is considered **less than cumulatively considerable**.

Mitigation Measures

None required.

Cumulative Impact to Telephone Services

Impact 4.13.3.4 The proposed project, in combination with approved, proposed, and other reasonably foreseeable projects in the cumulative study area, would result in increased demand for telephone services. However, the proposed project would not require improvements to AT&T's distribution system and would not contribute significantly to this cumulative impact. This impact is considered **less than cumulatively considerable**.

As described under Impact 4.13.3.2, the project site is currently provided telephone service by AT&T, and existing distribution infrastructure is present on and adjacent to the project site. The proposed project would not have significant demand for telephone service and would not require the extension or expansion of distribution infrastructure. As such, this impact is considered **less than cumulatively considerable**.

Mitigation Measures

None required.

CLIMATE CHANGE AND GREENHOUSE GASES

Greenhouse Gas Emissions and Global Climate Change

Impact 4.14.1 Long-term operations of the project could result in a substantial net increase of CO_{2e}, either directly or indirectly generating greenhouse gas emissions, that may have a significant impact on the environment. This impact is considered to be **less than cumulatively considerable**.

The cumulative increase in GHG concentrations in the atmosphere has resulted in and will continue to result in increases in global average temperatures and associated shifts in climatic and environmental conditions. Multiple adverse environmental effects are attributable to global climate change, such as sea level rise, increased incidence and intensity of severe weather events (e.g., heavy rainfall, droughts), and extirpation or extinction of plant and wildlife species. Given the significant adverse environmental effects linked to global climate change induced by GHGs, a substantial increase in the emission of GHGs is considered a significant impact.

The proposed project has the potential to result in a substantial increase in the emission of GHGs from well drilling/testing, construction activities, generation of vehicle traffic, energy use, and the use of gasoline-powered landscaping equipment.

GHG Emissions from Site Construction

GHG construction emissions would occur over the entire period of power plant site preparation and construction. Well site construction would also occur during this same period and intermittently over the life of the project. Construction activities would be limited to an approximately 15-acre power plant site, and a total of 3 acres of construction would occur for each well site (i.e., 2 acres per well pad and 1 acre of associated access road). The operation of construction equipment and vehicles would emit greenhouse gases due to combustion of fossil fuels, mainly CO₂, N₂O, and CH₄. The principal GHG that is emitted from construction sources is CO₂. The amounts of N₂O and CH₄ emitted from construction equipment and vehicle operations are much lower and, in conformance with California Air Pollution Control Officer's Association guidance, are considered negligible for the purposes of this analysis.

The URBEMIS model developed for the South Coast Air Quality Management District was used to estimate the annual CO₂ emissions occurring during power plant site and Brawley Wastewater Treatment Plant (BWWTP) construction activities and well site construction activities. Based on the results of the URBEMIS modeled construction activities, approximately 2,774 metric tons of CO₂ would be released during power plant site and BWWTP construction activities, and 539 metric tons of CO₂ would be released during construction of 31 new well sites (93 acres). The total estimated emissions from power plant and well site construction activities are estimated to be approximately 3,313 metric tons of CO₂ over the life of the project.

GHG Emissions from Drilling and Testing

The principal source of GHG emissions that would occur during drilling operations would result from diesel fuel combustion to run the engines used by the drill rig. An estimated 205 metric tons of CO₂ would be released to run the large portable diesel engines used during the drilling of each well. Assuming that the five existing exploration wells will be integrated into the project, then a total of 31 additional wells will be drilled for the project. This would result in a total release of about 6,355 metric tons of CO₂ over the life of the project from geothermal well drilling operations.

During geothermal well tests, the wells would be produced into portable steel tanks from which noncondensable gas (NCG) in the geothermal fluid would be released to the atmosphere. The NCG predominantly comprises CO₂, with a tiny fraction of CH₄. It is estimated that the GHG emissions from well testing would total about 1.2 metric tons of CO₂e for each well tested, for a total of approximately 37 metric tons of CO₂e over the life of the project from geothermal well testing operations.

GHG Emissions from Power Plant Operations

The binary technology proposed for the East Brawley Geothermal Development project is not expected to release NCG to the atmosphere during power plant operations. However, if the NCG content of the geothermal fluid cannot be adequately removed by the well pad separators, up to 25 percent of the geothermal fluid NCG will be transported to the power plant. In that event, essentially all of the CO₂ in noncondensable gas delivered to the power plant site would be released to the atmosphere, along with a small additional amount of CO₂ and CH₄ generated during the combustion of NCG in the regenerative thermal oxidizer/scrubber unit. This would amount to a maximum potential release of up to about 113,200 metric tons per year and a lifetime emission amount of 3,396,000 metric tons of CO₂e for a worst-case 49.9-megawatt power generation facility.

5.0 CUMULATIVE IMPACT ANALYSIS

**TABLE 4.14-2
TOTAL EMISSIONS GENERATED FROM PROPOSED PROJECT**

Emissions Source	CO₂e (metric tons/life of project)
Site Construction ¹	3,313
Well Drilling and Testing ¹	6,392
Worst-Case Scenario Power Plant Operations per Year ¹	113,200
TOTAL annualized emissions (30 years)	113,523
Emissions per MWh Generated ²	0.2593
Annual Avoided Emissions from Renewable Energy Generation ³	-767,180
Net emissions ⁴	-653,657

Sources: ¹ EMA 2011

² Based on an operating schedule of 24 hours/day, 365.5 days/year, the facility would produce 437,722 megawatt hours (MWh) of renewable electricity each year.

³ The avoided emissions scenario is a calculation of the facility electricity production in (2) if it were produced from non-renewable sources. CO₂, CH₄, and N₂O emission factors are from EPA's database eGRID for the WECC California subregion where the facility will be located.
http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2007V1_1_year05_SummaryTables.pdf.

⁴ The difference between annual emissions from site operation and construction and avoided emissions from renewable energy production.

As shown in **Table 4.14-2**, the proposed project would produce 0.2593 metric tons of CO₂ per megawatt-hour projected to be generated by the facility, which is below the California Energy Commission Emission Performance Standard of 0.500 metric tons CO₂ per megawatt-hour generated. Furthermore, the annual avoided emissions from renewable energy generation of the proposed project would equal 767,180 metric tons of CO₂ over the life of the facility for a net reduction of 653,657 metric tons. In other words, while the proposed geothermal facility would emit GHG emissions as a part of routine operations, the production of renewable energy that would be generated would result in avoided emissions and a net beneficial impact. GHG emissions for construction emissions and for project operations emissions would not result in a substantial net increase of CO₂e. The impact is **less than cumulatively considerable**.

Mitigation Measures

None required.

Conflict with Any Applicable Plan, Policy, or Regulation to Reduce Greenhouse Gas Emissions

Impact 4.14.2 The proposed project is required to be consistent with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases. This impact is considered **less than cumulatively considerable**.

The only adopted plan applicable to the project that reduces GHGs is the AB 32 Scoping Plan, which has identified 1990 emission levels as a goal to be achieved by the year 2020 through adoption of AB 32. Although implementation of AB 32 is currently delayed as a result of recent litigation, it is anticipated to move forward. To meet this goal, California would need to generate lower levels of GHG emissions than current levels. It is recognized that for most projects, there is

no simple metric available to determine if a single project would help or hinder meeting the AB 32 emission goals.

The proposed project has the potential to result in an increase in the emission of GHGs from construction activities, drilling operations, and general plant operations. However, as shown in **Table 4.14-2**, the proposed project would produce 0.2593 metric tons of CO₂ per megawatt-hour of energy produced at the facility, which is below the California Energy Commission emission performance standard of 0.500 metric tons CO₂ per megawatt-hour produced. Furthermore, the annual avoided emissions from renewable energy generation of the proposed project would equal 767,180 metric tons of CO₂ over the life of the facility for a net reduction of 653,657 metric tons of avoided emissions. This impact to **less than cumulatively considerable**.

Mitigation Measures

None required.

6.0 ALTERNATIVES

6.1 INTRODUCTION

State of California Environmental Quality Act (CEQA) Guidelines Section 15126.6(a) states that an environmental impact report (EIR) shall describe and analyze a range of reasonable alternatives to a project. These alternatives should feasibly attain most of the basic objectives of the project, while avoiding or substantially lessening one or more of the significant environmental impacts of the project. An EIR need not consider every conceivable alternative to a project, nor is it required to consider alternatives that are infeasible. The discussion of alternatives shall focus on those alternatives which are capable of avoiding or substantially lessening any significant effects of the project, even if they impede the attainment of the project objectives to some degree or would be more costly (CEQA Guidelines Section 15126.6[b]).

According to the State CEQA Guidelines, an EIR need only examine in detail those alternatives that could feasibly meet most of the basic objectives of the project. When addressing feasibility, State CEQA Guidelines Section 15126.6 states that "among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, jurisdictional boundaries, and whether the applicant can reasonably acquire, control or otherwise have access to alternative sites." The State CEQA Guidelines also specify that the alternatives discussion should not be remote or speculative; however, they need not be presented in the same level of detail as the assessment of the proposed project.

The State CEQA Guidelines indicate that several factors need to be considered in determining the range of alternatives to be analyzed in an EIR and the level of analytical detail that should be provided for each alternative. These factors include (1) the nature of the significant impacts of the proposed project; (2) the ability of alternatives to avoid or lessen the significant impacts associated with the project; (3) the ability of the alternatives to meet the objectives of the project; and (4) the feasibility of the alternatives. These factors would be unique for each project.

The significant environmental impacts of the proposed East Brawley Geothermal Development project that the alternatives will seek to eliminate or reduce were determined and based on the findings contained within each technical section evaluated in Sections 4.1 through 4.14 of this Draft Environmental Impact Report (Draft EIR or DEIR).

6.2 ALTERNATIVES UNDER CONSIDERATION

ALTERNATIVES SELECTED FOR ANALYSIS

The following alternatives were developed for analysis in the EIR:

- Alternative 1: No Project Alternative
- Alternative 2: Alternative Water Supply A Alternative
- Alternative 3: Alternative Water Supply B Alternative
- Alternative 4: Alternative Water Supply C Alternative

These alternatives constitute an adequate range of reasonable alternatives as required under State CEQA Guidelines Section 15126.6.

6.0 ALTERNATIVES

ALTERNATIVES CONSIDERED BUT NOT SELECTED FOR ANALYSIS

Off-Site Alternative

An alternative project location for the proposed project was considered, but it was determined that the project was specific to Ormat's geothermal leases in East Brawley. A geothermal project must be sited near the commercial geothermal resource it is utilizing because the geothermal resource cannot be transported long distances without losing its heat and viability as an exploitable energy source. Ormat acquired the proposed power plant location because of its location with respect to the geothermal resource and the availability for purchase. For this reason, an off-site alternative is considered infeasible pursuant to State CEQA Guidelines 15126.6(c).

Alternative Site Design Alternative

An alternative site design for the proposed project was preliminarily considered but was determined to be infeasible, as the project will utilize specific technology that cannot be substantially changed. In addition, an alternative site design would not lessen any of the project's significant environmental effects. For these reasons, an alternative site design alternative is considered infeasible pursuant to State CEQA Guidelines 15126.6(c).

6.3 ALTERNATIVE 1 – NO PROJECT ALTERNATIVE

Alternative 1 is the No Project Alternative. CEQA Guidelines Section 15126.6(e)(1) states that a No Project Alternative shall be analyzed. The purpose of describing and analyzing a No Project Alternative is to allow decision-makers to compare the impacts of approving a proposed project with the impacts of not approving the proposed project. The No Project Alternative analysis is not the baseline for determining whether the environmental impacts of a proposed project may be significant, unless the analysis is identical to the environmental setting analysis that does establish that baseline.

DESCRIPTION OF ALTERNATIVE

Alternative 1, the No Project Alternative, assumes that the proposed project is not approved or implemented and that the project site remains undeveloped and in agricultural production in accordance with its current General Plan designation and zoning.

ENVIRONMENTAL ANALYSIS

The following analysis is based on the significant environmental impacts identified in Sections 4.1 through 4.14. The reader is referred to these sections for further details on impacts associated with the proposed project.

Aesthetics

Creation of Substantial Light and Glare (Impact 4.1.3)

The proposed project would introduce new sources of light and glare related to reflective building materials and vehicle glass. This impact is considered less than significant with mitigation. It would be mitigated through implementation of mitigation measure MM 4.1.3

requiring the use of neutral paint colors and only non-reflective building materials and requires shielding of construction-related lighting.

Under Alternative 1, the project site would remain in its current condition, no new sources of light or glare would be created, and no mitigation would be required. Therefore, Alternative 1 would result in better conditions related to light and glare as compared to the proposed project.

Agricultural Resources

As identified in Section 4.2, Agricultural Resources, the proposed project would not result in any significant impacts associated with agriculture.

Alternative 1 would not involve any development on the project site and would not result in the conversion of any farmland. Therefore, Alternative 1 would also avoid any significant impacts to agricultural resources.

Air Quality

Individually and Cumulatively Violate an Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation (Impacts 4.3.2, 4.3.3, and 4.3.7)

The proposed project would result in the emission of criteria air pollutants, potentially violating an air quality standard or contributing to an existing violation. These impacts would be mitigated through implementation of mitigation measures MM 4.3.2a, MM 4.3.2b, MM 4.3.3a, and MM 4.3.3b.

Under Alternative 1, the project site would remain in its current condition and no additional criteria pollutants would be emitted. Therefore, Alternative 1 would result in better conditions related to potential air quality standard violation as compared to the proposed project.

Exposure of Public to Hazardous Air Pollutants (Impact 4.3.5)

The proposed project would result in the emission of the hazardous air pollutant (HAP) benzene. This impact would be mitigated through implementation of mitigation measure MM 4.3.5.

Under Alternative 1, the proposed facility would not be constructed or operated and no benzene or other hazardous air pollutants would be emitted. Therefore, Alternative 1 would result in better conditions related to HAP emissions as compared to the proposed project.

Biological and Natural Resources

Impacts to Endangered, Threatened, and Other Listed Species (Impact 4.4.1)

The proposed project could result in impacts to the southwestern willow flycatcher if it is found to be present on the project site. This impact would be mitigated through implementation of mitigation measures MM 4.4.1a and MM 4.4.1b.

Under Alternative 1, the project site would not be developed and no impacts to the southwestern willow flycatcher would occur. No mitigation would be required. Therefore, Alternative 1 would result in better conditions related to endangered, threatened, and other listed species as compared to the proposed project.

6.0 ALTERNATIVES

Impacts to Species of Concern, California Fully Protected, and Other Non-listed Special-Status Species (Impact 4.4.2)

Migratory Birds and Raptors (excluding the western burrowing owl)

The proposed project could result in impacts to multiple species of migratory birds and raptors and their associated foraging and nesting habitats. This impact would be mitigated through implementation of mitigation measure MM 4.4.2a.

Other Special-Status Mammal Species (American Badger)

The proposed project could result in impacts to the American badger if it is found to be present on or adjacent to the project site. This impact would be mitigated through implementation of mitigation measures MM 4.4.2b, MM 4.4.2c, and MM 4.4.2d.

Under Alternative 1, the project site would not be developed and no impacts to migratory birds or raptors or other special-status mammal species would occur. No mitigation would be required. Therefore, Alternative 1 would result in better conditions related to species of concern, California fully protected, and other non-listed special-status species as compared to the proposed project.

Impacts to Western Burrowing Owl (Impact 4.4.3)

The proposed project could result in impacts to the western burrowing owl if it is found to be present on or adjacent to the project site. This impact would be mitigated through implementation of mitigation measures MM 4.4.2c, MM 4.4.2d, and MM 4.4.3.

Under Alternative 1, the project site would not be developed and no impacts to the western burrowing owl would occur. No mitigation would be required. Therefore, Alternative 1 would result in better conditions related to the western burrowing owl as compared to the proposed project.

Impacts to Sensitive Biological Communities, Including Riparian Habitat (Impact 4.4.4)

The proposed project could result in disturbance, degradation, and removal of riparian habitat along the New River. This impact would be mitigated through implementation of mitigation measures MM 4.4.4a and MM 4.4.4b.

Under Alternative 1, the project site would not be developed and no impacts to riparian habitat would occur. No mitigation would be required. Therefore, Alternative 1 would result in better conditions related to sensitive biological communities, including riparian habitat, as compared to the proposed project.

Impacts to Jurisdictional Wetlands and Waters of the U.S. (Impact 4.4.5)

The proposed project could result in impacts to jurisdictional wetlands and waters of the U.S., including the New River and several irrigation canals. This impact would be mitigated through implementation of mitigation measure MM 4.4.5.

Under Alternative 1, the project site would not be developed and no impacts to jurisdictional wetlands or waters of the U.S. would occur. No mitigation would be required. Therefore,

Alternative 1 would result in better conditions related to jurisdictional wetlands and waters of the U.S. as compared to the proposed project.

Cumulative Impacts to Special-Status and Sensitive Species (Impact 4.4.8)

The proposed project would contribute to a cumulative reduction of drainage water draining to the Salton Sea, potentially impacting special-status and sensitive species that inhabit the area. This impact would be mitigated through implementation of mitigation measures MM 4.4.1 through MM 4.4.5.

Under Alternative 1, the project site would not be developed and no water would be diverted from the Salton Sea. No mitigation would be required. Therefore, Alternative 1 would result in better conditions related to cumulative impacts to special-status and sensitive species as compared to the proposed project.

Cultural Resources

Individual and Cumulative Impacts to Prehistoric, Historic and Paleontological Resources, and Human Remains (Impacts 4.5.1, 4.5.2, 4.5.3, and 4.5.4)

The proposed project could potentially disturb unknown cultural and/or paleontological resources or human remains during ground-disturbing activities. These impacts would be mitigated through implementation of mitigation measures MM 4.5.1a, MM 4.5.1b, and MM 4.5.2.

Under Alternative 1, the project site would remain in its current conditions and no ground-disturbing activities would occur. Therefore, Alternative 1 would result in better conditions related to the disturbance of prehistoric, historic and paleontological resources, and human remains as compared to the proposed project.

Geology and Soils

Seismic Ground Shaking Impacts (Impact 4.6.2)

Due to its proximity to regional faults, the proposed project has the potential to experience strong ground shaking in the event of seismic activity. This impact would be mitigated through implementation of mitigation measure MM 4.6.2.

Under Alternative 1, the proposed facility would not be constructed and no additional people would be exposed to the hazards associated with seismic ground shaking. Therefore, Alternative 1 would result in better conditions related to seismic ground shaking as compared to the proposed project.

Project and Cumulative Erosion Impacts (Impacts 4.6.4 and 4.6.8)

The proposed project has the potential to result in soil erosion and contribute to cumulative soil erosion during ground-disturbing activities. This impact would be mitigated through compliance with National Pollution Discharge Elimination System (NPDES) permit requirements and through implementation of mitigation measures MM 4.3.2a, MM 4.6.2, MM 4.6.6, and MM 4.8.1.

Under Alternative 1, the project site would remain in its current condition and no ground-disturbing activities or associated soil erosion would occur. Therefore, Alternative 1 would result in better conditions related to soil erosion as compared to the proposed project.

6.0 ALTERNATIVES

Expansive Soil (Impact 4.6.6)

The project site contains expansive soils potentially affecting the proposed structures. This impact would be mitigated through implementation of mitigation measure MM 4.6.6.

Under Alternative 1, no structures would be built on the project site and no excavations or filling would occur. Therefore, Alternative 1 would result in better conditions related to expansive soils as compared to the proposed project.

Hazardous Materials/Public Health

Hazard to the Public Through Routine Transport, Use, Disposal, or Accidental Release of Hazardous Materials (Impacts 4.7.1 and 4.7.2)

Implementation of the proposed project would result in the transport, use, storage, and disposal of hazardous materials during both construction and operation and could potentially result in the accidental release of hazardous materials. This impact would be mitigated through implementation of mitigation measures MM 4.7.1a and MM 4.7.1b.

Under Alternative 1, the proposed facility would not be constructed or operated and no hazardous materials would be transported, used, stored, or disposed of on the project site beyond current conditions. Therefore, Alternative 1 would result in better conditions related to public hazards associated with hazardous materials as compared to the proposed project.

Public Airport Hazards (Impact 4.7.4)

Operation of the proposed facility in proximity to an airport could pose a safety risk to employees and aircraft taking off from or approaching the airport. This impact would be mitigated through implementation of mitigation measure MM 4.7.4.

Under Alternative 1, the proposed facility would not be constructed or operated and there would be no risk associated with aircraft or the airport. Therefore, Alternative 1 would result in better conditions related to airport hazards compared to the proposed project.

Hydrology and Water Quality

Construction-Phase Water Quality Impacts (Impact 4.8.1)

Construction of the proposed project, including soil-disturbing activities, could result in erosion and sedimentation or release of other pollutants to local waterways. This impact would be mitigated through implementation of mitigation measure MM 4.8.1.

Under Alternative 1, the proposed project would not be constructed and no new soil-disturbing activities would occur on the project site. Therefore, Alternative 1 would result in better conditions related to construction-phase water quality as compared to the proposed project.

Substantially Degrade Water Quality: Operational Water Quality Impacts (Impact 4.8.2)

Operation of the proposed project would introduce impervious surfaces and structures to the project site, resulting in increased runoff and the release of pollutants to local waterways. This impact would be mitigated through implementation of mitigation measure MM 4.8.2.

Under Alternative 1, the proposed project would not be constructed or operated on the project site and no increase in runoff or associated pollutants would occur. Therefore, Alternative 1 would result in better conditions related to operational water quality as compared to the proposed project.

Cumulative Hydrology and Water Quality Impacts (Impact 4.8.3 and 4.8.5)

Implementation of the proposed project would increase in impervious surface area and contribute to cumulative water quality degradation, changes to runoff patterns, and the potential for increased flooding within the watershed. However, this impact would be minimized through project design, including retention basins, through compliance with the applicable NPDES permits, and through implementation of mitigation measures MM 4.8.1 and 4.8.2.

Under Alternative 1, the proposed project would not be constructed or operated on the project site and there would be no contribution to cumulative hydrology and water quality impacts. No mitigation would be required. Therefore, Alternative 1 would result in better conditions related to cumulative hydrology and water quality impacts as compared to the proposed project.

Land Use and Planning

Incompatibility with Adjacent Land Uses (Impact 4.9.2)

Development of the proposed geothermal energy facility in a primarily agricultural area could result in land use incompatibilities. This impact would be mitigated through implementation of mitigation measures MM 4.9.2a and MM 4.9.2b.

Under Alternative 1, the proposed project would not be implemented, the project site would remain in its current conditions, and no new land incompatibilities would be created. Therefore, Alternative 1 would result in better conditions related to land use incompatibility as compared to the proposed project.

Noise

As identified in Section 4.10, Noise, the proposed project would not result in any significant impacts associated with noise.

Alternative 1 would not involve the construction or operation of any new development on the project site and would not increase short-term or long-term noise levels in the area. Therefore, Alternative 1 would also avoid any significant impacts related to noise.

Public Services

Individual and Cumulative Increased Demand for Fire Protection Services (Impacts 4.11.1.2 and 4.11.1.3)

Implementation of the proposed project would result in an increase in demand for fire protection services and would contribute to a cumulative increase in demand for such services. This impact would be mitigated through implementation of mitigation measures MM 4.11.1.2a and MM 4.11.1.2b.

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Under Alternative 1, the proposed project would not be implemented and no increase in demand for fire protection services would occur. Therefore, Alternative 1 would result in better conditions related to demand for fire protection services as compared to the proposed project.

Transportation and Circulation

As identified in Section 4.12, Transportation and Circulation, the proposed project would not result in any significant impacts associated with transportation and circulation.

Alternative 1 would not result in any development on the project site and would also avoid any significant impacts related to transportation and circulation.

Utilities

As identified in Section 4.13, Utilities, the proposed project would not result in any significant impacts associated with utilities.

Alternative 1 would not result in any development on the project site and would also avoid any significant impacts related to utilities.

Climate Change and Greenhouse Gases

Greenhouse Gas Emissions and Global Climate Change (Impacts 4.14.1 and 4.14.2)

GHG emissions for construction emissions and for project operations emissions would not result in a substantial net increase of CO₂e.

Under Alternative 1, the proposed project would not be constructed or operated and no increase in CO₂e emissions would occur. However, this alternative would also preclude the development of a renewable energy production facility on the project site. While construction and operation of the proposed project would result in a nominal increase in CO₂e emissions, the project would also supply electricity from a renewable source to 50,000 people (49.9 MW), resulting in a substantial reduction of GHG emissions compared to traditional, nonrenewable sources. Further, AB 32 specifically requires that 33 percent of the state's electricity come from renewable sources by 2020. Therefore, this alternative would conflict with state climate change policy by eliminating a project that would help comply with this requirement. Alternative 1 would result in worse conditions related to greenhouse gas emissions and global climate change as compared to the proposed project.

6.4 ALTERNATIVE 2 – ALTERNATIVE WATER SUPPLY A ALTERNATIVE

DESCRIPTION OF ALTERNATIVE

Under Alternative 2, the Alternative Water Supply A Alternative, the proposed project would be designed, constructed, and operated similar to the proposed project and would also utilize reclaimed water from the Brawley Wastewater Treatment Plant as its primary water supply (approximately 4,369 acre-feet per year) upon completion of the proposed upgrades. However, the remaining water demand (approximately 1,131 acre-feet per year) required during summer heat conditions would be obtained by treating and reusing cooling tower blowdown water from the proposed plant as well as from the existing North Brawley plant.

Cooling water would be used to cool the motive fluid in the condensers and would cycle back to a cooling tower, where the water would be cooled, treated, and reused rather than injected back into the geothermal reservoir.

ENVIRONMENTAL ANALYSIS

The following analysis is based on the significant environmental impacts identified in Sections 4.1 through 4.14. The reader is referred to these sections for further details on impacts associated with the proposed project.

Aesthetics

Creation of Substantial Light and Glare (Impact 4.1.3)

The proposed project would introduce new sources of light and glare related to reflective building materials and vehicle glass. This impact is considered potentially significant, but would be mitigated through implementation of mitigation measure MM 4.1.3 requiring the use of neutral paint colors and only non-reflective building materials.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, new sources of light and glare could be created on the site from the use of reflective building materials as well from glass windows of parked vehicles. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.1.3. Therefore, Alternative 2 would result in similar conditions related to light and glare as compared to the proposed project.

Agricultural Resources

As identified in Section 4.2, Agricultural Resources, the proposed project would not result in any significant impacts associated with agriculture.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, a portion of the project site (approximately 32.75 acres) would be removed from agricultural production and developed with plant facilities and well pads. However, as discussed under Impacts 4.2.1 and 4.2.2, this alternative would be consistent with Imperial County General Plan policies related to the preservation of Important Farmland and is therefore not considered to be a significant impact. Therefore, Alternative 2 would also avoid any significant impacts to agricultural resources.

Air Quality

Individually and Cumulatively Violate an Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation (Impacts 4.3.2, 4.3.3, and 4.3.7)

The proposed project would result in the emission of criteria air pollutants, potentially violating an air quality standard or contributing to an existing violation. These impacts would be mitigated through implementation of mitigation measures MM 4.3.2a, MM 4.3.2b, MM 4.3.3a, and MM 4.3.3b.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would result in similar air emissions that could violate an air quality standard or contribute to an existing standard violation. However, similar to

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the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.3.2a, MM 4.3.2b, MM 4.3.3a, and MM 4.3.3b. Therefore, Alternative 2 would result in similar conditions related to air emissions as compared to the proposed project.

Exposure of Public to Hazardous Air Pollutants (Impact 4.3.5)

The proposed project would result in the emission of the hazardous air pollutant (HAP) benzene. This impact would be mitigated through implementation of mitigation measure MM 4.3.5.

Under Alternative 2, a geothermal energy facility would be operated on the project site similar to the proposed project and would result in the emissions of the HAP benzene. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measure MM 4.3.5. Therefore, Alternative 2 would result in similar conditions related to the emissions of HAPs as compared to the proposed project.

Biological and Natural Resources

Impacts to Endangered, Threatened, and Other Listed Species (Impact 4.4.1)

The proposed project could result in impacts to the southwestern willow flycatcher if it is found to be present on the project site. This impact would be mitigated through implementation of mitigation measures MM 4.4.1a and MM 4.4.1b.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative could result in similar impacts to the southwestern willow flycatcher if it is found to be present on the project site. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.4.1a and MM 4.4.1b. Therefore, Alternative 2 would result in similar conditions related to endangered, threatened, and other listed species as compared to the proposed project.

Impacts to Species of Concern, California Fully Protected, and Other Non-listed Special-Status Species (Impact 4.4.2)

Migratory Birds and Raptors (excluding the western burrowing owl)

The proposed project could result in impacts to multiple species of migratory birds and raptors and their associated foraging and nesting habitats. This impact would be mitigated through implementation of mitigation measure MM 4.4.2a.

Other Special-status Mammal Species (American Badger)

The proposed project could result in impacts to the American badger if it is found to be present on or adjacent to the project site. This impact would be mitigated through implementation of mitigation measures MM 4.4.2b, MM 4.4.2c, and MM 4.4.2d.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative could result in similar impacts to migratory birds and raptors and other special-status mammal species. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.4.2a through MM 4.4.2d. Therefore, Alternative 2 would result in similar conditions related to species of

concern, California fully protected, and other non-listed special-status species as compared to the proposed project.

Impacts to Western Burrowing Owl (Impact 4.4.3)

The proposed project could result in impacts to the western burrowing owl if it is found to be present on or adjacent to the project site. This impact would be mitigated through implementation of mitigation measures MM 4.4.2c, MM 4.4.2d, and MM 4.4.3.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative could result in similar impacts to the western burrowing owl. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.4.2c, MM 4.4.2d, and MM 4.4.3. Therefore, Alternative 2 would result in similar conditions related to the western burrowing owl as compared to the proposed project.

Impacts to Sensitive Biological Communities, Including Riparian Habitat (Impact 4.4.4)

The proposed project could result in disturbance, degradation, and removal of riparian habitat along the New River. This impact would be mitigated through implementation of mitigation measures MM 4.4.4a and MM 4.4.4b.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative could result in similar impacts to sensitive biological communities, including riparian habitat. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.4.4a and MM 4.4.4b. Therefore, Alternative 2 would result in similar conditions related to sensitive biological communities, including riparian habitat, as compared to the proposed project.

Impacts to Jurisdictional Wetlands and Waters of the U.S. (Impact 4.4.5)

The proposed project could result in impacts to jurisdictional wetlands and waters of the U.S., including the New River and several irrigation canals. This impact would be mitigated through implementation of mitigation measure MM 4.4.5.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative could result in impacts to jurisdictional wetlands and waters of the U.S., including the New River and several irrigation canals. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measure MM 4.4.5. Therefore, Alternative 2 would result in similar conditions related to jurisdictional wetlands and waters of the U.S. as compared to the proposed project.

Cumulative Impacts to Special-Status and Sensitive Species (Impact 4.4.8)

The proposed project would contribute to a cumulative reduction of drainage water draining to the Salton Sea, potentially impacting special-status and sensitive species that inhabit the area. This impact would be mitigated through implementation of mitigation measures MM 4.4.1 through MM 4.4.5.

Under Alternative 2, water would be obtained from the Brawley Wastewater Treatment Plant as well as from recycling cooling tower blowdown from the proposed plant and the North Brawley plant. As a portion of the project's water demand (1,131 acre-feet per year) would be met with

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recycled water from the plant itself, the project would divert less water from the Salton Sea. Therefore, Alternative 2 would result in better conditions related to cumulative impacts to special-status and sensitive species as compared to the proposed project.

Cultural Resources

Individual and Cumulative Impacts to Prehistoric, Historic and Paleontological Resources, and Human Remains (Impacts 4.5.1, 4.5.2, 4.5.3, and 4.5.4)

The proposed project could potentially disturb unknown cultural and/or paleontological resources or human remains during ground-disturbing activities. These impacts would be mitigated through implementation of mitigation measures MM 4.5.1a, MM 4.5.1b, and MM 4.5.2.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would include similar ground-disturbing construction activities that could disturb unknown cultural and/or paleontological resources or human remains. However, similar to the proposed project this impact could be mitigated through implementation of mitigation measures MM 4.5.1a, MM 4.5.1b, and MM 4.5.2. Therefore, Alternative 2 would result in similar conditions related to cultural and paleontological resources and human remains as compared to the proposed project.

Geology and Soils

Seismic Ground Shaking Impacts (Impact 4.6.2)

Due to its proximity to regional faults, the proposed project has the potential to experience strong ground shaking in the event of seismic activity. This impact would be mitigated through implementation of mitigation measure MM 4.6.2.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would also have the potential to experience strong ground shaking in the event of seismic activity. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.6.2. Therefore, Alternative 2 would result in similar conditions related to seismic ground shaking as compared to the proposed project.

Project and Cumulative Erosion Impacts (Impacts 4.6.4 and 4.6.8)

The proposed project has the potential to result in soil erosion and contribute to cumulative soil erosion during ground-disturbing activities. This impact would be mitigated through compliance with NPDES permit requirements and through implementation of mitigation measures MM 4.3.2a, MM 4.6.2, MM 4.6.6, and MM 4.8.1.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would include similar ground-disturbing construction activities that could result in soil erosion. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measures MM 4.3.2a, MM 4.6.2, MM 4.6.6, and MM 4.8.1. Therefore, Alternative 2 would result in similar conditions related to soil erosion as compared to the proposed project.

Expansive Soil (Impact 4.6.6)

The project site contains expansive soils potentially affecting the proposed structures. This impact would be mitigated through implementation of mitigation measure MM 4.6.6.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, the structures proposed under this alternative could also be affected by the expansive soils present on the site. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.6.6. Therefore, Alternative 2 would result in similar conditions related to expansive soils as compared to the proposed project.

Hazardous Materials/Public Health

Hazard to the Public through Routine Transport, Use, Disposal, or Accidental Release of Hazardous Materials (Impacts 4.7.1 and 4.7.2)

Implementation of the proposed project would result in the use, storage, and disposal of hazardous materials during both construction and operation and could potentially result in the accidental release of hazardous materials. This impact would be mitigated through implementation of mitigation measures MM 4.7.1a and MM 4.7.1b.

Under Alternative 2, a geothermal energy facility would be operated on the project site similar to the proposed project and could result in the routine transport, use, disposal, and/or accidental release of hazardous materials in the vicinity. However, this impact would be mitigated through implementation of mitigation measures MM 4.7.1a and MM 4.7.1b. Therefore, Alternative 2 would result in similar conditions related to hazardous materials as compared to the proposed project.

Public Airport Hazards (Impact 4.7.4)

Operation of the proposed facility in proximity to an airport could pose a safety risk to employees and aircraft taking off from or approaching the airport. This impact would be mitigated through implementation of mitigation measure MM 4.7.4.

Under Alternative 2, a geothermal energy facility would be operated on the project site similar to the proposed project, thereby posing a safety risk to employees and aircraft. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.7.4. Therefore, Alternative 2 would result in similar conditions related to airport hazards as compared to the proposed project.

Interfere with Emergency Plans (Impact 4.7.6)

The proposed project would result in increased demand for emergency services, thereby potentially affecting response times and implementation of emergency response and evacuation plans. This impact would be mitigated through implementation of mitigation measure MM 4.7.1b.

Under Alternative 2, a geothermal energy facility would be operated on the project site, resulting in increased demand for emergency services similar to the proposed project. However, similar to the proposed project, this impact would be mitigated through implementation of

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mitigation measures MM 4.7.1b. Therefore, Alternative 2 would result in similar conditions related to emergency plans as compared to the proposed project.

Hydrology and Water Quality

Construction-Phase Water Quality Impacts (Impact 4.8.1)

Construction of the proposed project, including soil-disturbing activities, could result in erosion and sedimentation or release of other pollutants to local waterways. This impact would be mitigated through implementation of mitigation measure MM 4.8.1.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would include similar activities that could result in erosion and sedimentation and release of other pollutants to local waterways. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.8.1. Therefore, Alternative 2 would result in similar conditions related to construction-phase water quality as compared to the proposed project.

Substantially Degrade Water Quality: Operational Water Quality Impacts (Impact 4.8.2)

Operation of the proposed project would introduce impervious surfaces and structures to the project site, resulting in increased runoff and the release of pollutants to local waterways. This impact would be mitigated through implementation of mitigation measure MM 4.8.2.

Under Alternative 2, a geothermal energy facility would be operated on the project site similar to the proposed project, resulting in increased runoff and the release of pollutants to local waterways. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.8.2. Therefore, Alternative 2 would result in similar conditions related to operational water quality as compared to the proposed project.

Cumulative Hydrology and Water Quality Impacts (Impact 4.8.3 and 4.8.5)

Implementation of the proposed project would contribute to an increase in impervious surface areas and cumulative water quality degradation, changes to runoff patterns, and the potential for increased flooding within the watershed. However, this contribution would be minimized through project design, including retention basins, through compliance with the applicable NPDES permits, and through implementation of mitigation measures MM 4.8.1 and MM 4.8.2.

Under Alternative 2, a geothermal energy facility would be developed and operated on the project site similar to the proposed project, resulting in a potentially significant contribution to cumulative water quality degradation, changes to runoff patterns, and increases in flooding potential. However, similar to the proposed project, this contribution would be minimized through the use of retention basins, compliance with applicable NPDES permits, and implementation of mitigation measures MM 4.8.1 and MM 4.8.2. Therefore, Alternative 2 would result in similar conditions related to cumulative hydrology and water quality impacts as compared to the proposed project.

Land Use and Planning

Incompatibility with Adjacent Land Uses (Impact 4.9.2)

Development of the proposed geothermal energy facility in a primarily agricultural area could result in land use incompatibilities. This impact would be mitigated through implementation of mitigation measures MM 4.9.2a and MM 4.9.2b.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would result in similar land use compatibility issues. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measures MM 4.9.2a and MM 4.9.2b. Therefore, Alternative 2 would result in similar conditions related to land use compatibility as compared to the proposed project.

Noise

As identified in Section 4.10, Noise, the proposed project would not result in any significant impacts associated with noise.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. The proposed alternative water supply would not affect projected noise levels associated with construction or operation of the proposed plant. Therefore, Alternative 2 would also avoid significant impacts related to noise.

Public Services

Individual and Cumulative Increased Demand for Fire Protection Services (Impacts 4.11.1.2 and 4.11.1.3)

Implementation of the proposed project would result in an increase in demand for fire protection services and would contribute to a cumulative increase in demand for such services. This impact would be mitigated through implementation of mitigation measure MM 4.11.1.2a and MM 4.11.1.2b.

Under Alternative 2, a geothermal energy facility would be operated on the project site, resulting in increased demand for fire protection services similar to the proposed project. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.11.1.2a and MM 4.11.1.2b. Therefore, Alternative 2 would result in similar conditions related to fire protection services as compared to the proposed project.

Transportation and Circulation

As identified in Section 4.12, Transportation and Circulation, the proposed project would not result in any significant impacts associated with transportation and circulation.

Under Alternative 2, the project site would be developed as a geothermal energy facility similar to the proposed project. The proposed alternative water supply would not affect projected vehicle trip generation associated with construction or operation of the proposed plant. Therefore, Alternative 2 would also avoid any significant impacts related to transportation and circulation.

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Utilities

As identified in Section 4.13, Utilities, the proposed project would not result in any significant impacts associated with utilities.

As described above, Alternative 2 would not require any water from IID, as cooling tower blowdown from the proposed plant and the North Brawley plant would be treated and reused for plant operations during summer heat conditions. As no water would be obtained from IID, Alternative 2 would result in better conditions related to utilities as compared to the proposed project.

Climate Change and Greenhouse Gases

Greenhouse Gas Emissions and Global Climate Change (Impacts 4.14.1 and 4.14.2)

GHG emissions for construction emissions and for project operations emissions would not result in a substantial net increase of CO₂e.

Under Alternative 2, a geothermal energy facility would be operated on the project site similar to the proposed project. As such, this alternative would not result in a substantial net increase of CO₂e. Therefore, Alternative 2 would result in similar conditions related to greenhouse gas emissions and global climate change as compared to the proposed project.

6.5 ALTERNATIVE 3 – ALTERNATIVE WATER SUPPLY B ALTERNATIVE

DESCRIPTION OF ALTERNATIVE

Under Alternative 3, the Alternative Water Supply B Alternative, the proposed project would be designed, constructed, and operated similar to the proposed project and would also utilize reclaimed water from the Brawley Wastewater Treatment Plant as its primary water supply (approximately 4,369 acre-feet per year). However, the remaining water demand (approximately 1,131 acre-feet per year) required during summer heat conditions would be obtained from groundwater supplies.

Groundwater in the area is not suitable for municipal or agricultural use and would need to be treated prior to use, either with reverse osmosis membranes or with a nano-filtration membrane. A conceptual groundwater system has been developed for this alternative and would include two groundwater wells drilled on site, with each well being about 400–700 feet in depth. The wells would be approximately 24 inches in diameter at the top and telescope with depth. Each well pad would be up to 30 square feet. The total production capacity of the wells would be up to about 1,500 gallon per minute if used only as a backup source. In order to pump the water from the wells, a centrifugal vertical production pump would be installed on each well. The water would be pumped through carbon steel pipes to a water desalination system for purification for use in the cooling tower. The system would be based on salt rejection membranes (nano-filtration and reverse osmosis).

The system would comprise various components including a sand separator, chemical dosing system (anti-scalant and acid), a series of micron filters and membranes, two booster pumps, and a control system programmable logic controller (PLC controlled). The desalination system is expected to have a 40 to 60 percent recovery ratio (40 to 60 percent of the feed would be purified and used as cooling water makeup). The water desalination system would have two streams: permeate and concentrate. The permeate would be used for cooling tower makeup.

Because this water would be very clean, it is expected that 5–10 cycles of concentration in the cooling tower would be achieved with this water source. The concentrate would be injected into the geothermal reservoir together with the cooling tower blowdown.

As a part of this alternative, the project applicant would implement a mitigation program to monitor and prevent subsidence. Adequate subsidence network benchmarks would be placed around the plant site and tied to the County first order network and would be surveyed annually to detect the occurrence of subsidence. This data would be promptly submitted to the Imperial County Department of Public Works. The benchmarks would be installed to conform to County standards. Surveying would be performed to National Geodetic Survey standards. Measures such as increased injection rates, deeper injection wells, and/or curtailed production operations would be initiated subject to division approval if a recognizable subsidence bowl forms in the project vicinity or if unusual aquifer or injection internal pressure changes are observed.

ENVIRONMENTAL ANALYSIS

The following analysis is based on the significant environmental impacts identified in Sections 4.1 through 4.14. The reader is referred to these sections for further details on impacts associated with the proposed project.

Aesthetics

Creation of Substantial Light and Glare (Impact 4.1.3)

The proposed project would introduce new sources of light and glare related to reflective building materials and vehicle glass. This impact is considered potentially significant, but would be mitigated through implementation of mitigation measure MM 4.1.3 requiring the use of neutral paint colors and only non-reflective building materials.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project, with additional appurtenant structures. As such, new sources of light and glare could be created on the site from the use of reflective building materials as well from glass windows of parked vehicles. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.1.3. Therefore, Alternative 3 would result in similar conditions related to light and glare as compared to the proposed project.

Agricultural Resources

As identified in Section 4.2, Agricultural Resources, the proposed project would not result in any significant impacts associated with agriculture.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project, with additional appurtenant structures. As such, a portion of the project site (approximately 32.75 acres) would be removed from agricultural production and developed with plant facilities and well pads. However, as discussed under Impacts 4.2.1 and 4.2.2, this alternative would be consistent with Imperial County General Plan policies related to the preservation of Important Farmland and is therefore not considered to be a significant impact. Therefore, Alternative 3 would also avoid any significant impacts to agricultural resources.

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Air Quality

Individually and Cumulatively Violate an Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation (Impacts 4.3.2, 4.3.3, and 4.3.4)

The proposed project would result in the emission of criteria air pollutants, potentially violating an air quality standard or contributing to an existing violation. These impacts would be mitigated through implementation of mitigation measures MM 4.3.2a, MM 4.3.2b, MM 4.3.3a, and MM 4.3.3b.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project, with additional appurtenant structures. As such, this alternative would result in similar air emissions that could violate an air quality standard or contribute to an existing standard violation. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.3.2a, MM 4.3.2b, MM 4.3.3a, and MM 4.3.3b. Therefore, Alternative 3 would result in similar conditions related to air emissions as compared to the proposed project.

Exposure of Public to Hazardous Air Pollutants (Impact 4.3.5)

The proposed project would result in the emission of the hazardous air pollutant (HAP) benzene. This impact would be mitigated through implementation of mitigation measure MM 4.3.5.

Under Alternative 3, a geothermal energy facility would be operated on the project site similar to the proposed project and would result in the emissions of the HAP benzene. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measure MM 4.3.5. Therefore, Alternative 3 would result in similar conditions related to the emissions of HAPs as compared to the proposed project.

Biological and Natural Resources

Impacts to Endangered, Threatened, and Other Listed Species (Impact 4.4.1)

The proposed project could result in impacts to the southwestern willow flycatcher if it is found to be present on the project site. This impact would be mitigated through implementation of mitigation measures MM 4.4.1a and MM 4.4.1b.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project, with additional appurtenant structures. As such, this alternative could result in similar impacts to the southwestern willow flycatcher if it is found to be present on the project site. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.4.1a and MM 4.4.1b. Therefore, Alternative 3 would result in similar conditions related to endangered, threatened, and other listed species as compared to the proposed project.

Impacts to Species of Concern, California Fully Protected, and Other Non-listed Special-Status Species (Impact 4.4.2)

Migratory Birds and Raptors (excluding the western burrowing owl)

The proposed project could result in impacts to multiple species of migratory birds and raptors and their associated foraging and nesting habitats. This impact would be mitigated through implementation of mitigation measure MM 4.4.2a.

Other Special-status Mammal Species (American Badger)

The proposed project could result in impacts to the American badger if it is found to be present on or adjacent to the project site. This impact would be mitigated through implementation of mitigation measures MM 4.4.2b, MM 4.4.2c, and MM 4.4.2d.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project, with additional appurtenant structures. As such, this alternative could result in similar impacts to migratory birds and raptors and other special-status mammal species. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.4.2a through MM 4.4.2d. Therefore, Alternative 3 would result in similar conditions related to species of concern, California fully protected, and other non-listed special-status species as compared to the proposed project.

Impacts to Western Burrowing Owl (Impact 4.4.3)

The proposed project could result in impacts to the western burrowing owl if it is found to be present on or adjacent to the project site. This impact would be mitigated through implementation of mitigation measures MM 4.4.2c, MM 4.4.2d, and MM 4.4.3.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project, with additional appurtenant structures. As such, this alternative could result in similar impacts to the western burrowing owl. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.4.2c, MM 4.4.2d, and MM 4.4.3. Therefore, Alternative 3 would result in similar conditions related to the western burrowing owl as compared to the proposed project.

Impacts to Sensitive Biological Communities, Including Riparian Habitat (Impact 4.4.4)

The proposed project could result in disturbance, degradation, and removal of riparian habitat along the New River. This impact would be mitigated through implementation of mitigation measures MM 4.4.4a and MM 4.4.4b.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative could result in similar impacts to sensitive biological communities, including riparian habitat. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.4.4a and MM 4.4.4b. Therefore, Alternative 3 would result in similar conditions related to sensitive biological communities, including riparian habitat, as compared to the proposed project.

6.0 ALTERNATIVES

Impacts to Jurisdictional Wetlands and Waters of the U.S. (Impact 4.4.5)

The proposed project could result in impacts to jurisdictional wetlands and waters of the U.S., including the New River and several irrigation canals. This impact would be mitigated through implementation of mitigation measure MM 4.4.5.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project, with additional appurtenant structures. As such, this alternative could result in impacts to jurisdictional wetlands and waters of the U.S., including the New River and several irrigation canals. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measure MM 4.4.5. Therefore, Alternative 3 would result in similar conditions related to jurisdictional wetlands and waters of the U.S. as compared to the proposed project.

Cumulative Impacts to Special-Status and Sensitive Species (Impact 4.4.8)

The proposed project would contribute to a cumulative reduction of drainage water draining to the Salton Sea, potentially impacting special-status and sensitive species that inhabit the area. This impact would be mitigated through implementation of mitigation measures MM 4.4.1 through MM 4.4.5.

Under Alternative 3, water would be obtained from the Brawley Wastewater Treatment Plant as well as from groundwater from the underlying aquifer. As a portion of the project's water demand (1,131 acre-feet per year) would be met with groundwater, the project would divert less water from the Salton Sea. Therefore, Alternative 3 would result in better conditions related to cumulative impacts to special-status and sensitive species as compared to the proposed project.

Cultural Resources

Individual and Cumulative Impacts to Prehistoric, Historic and Paleontological Resources, and Human Remains (Impacts 4.5.1, 4.5.2, 4.5.3, and 4.5.4)

The proposed project could potentially disturb unknown cultural and/or paleontological resources or human remains during ground-disturbing activities. These impacts would be mitigated through implementation of mitigation measures MM 4.5.1a, MM 4.5.1b, and MM 4.5.2.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project, with additional appurtenant structures, which would not require additional ground disturbance. As such, this alternative would include similar ground-disturbing construction activities that could disturb unknown cultural and/or paleontological resources or human remains. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measures MM 4.5.1a, MM 4.5.1b, and MM 4.5.2. Therefore, Alternative 3 would result in similar conditions related to cultural and paleontological resources and human remains as compared to the proposed project.

Geology and Soils

Seismic Ground Shaking Impacts (Impact 4.6.2)

Due to its proximity to regional faults, the proposed project has the potential to experience strong ground shaking in the event of seismic activity. This impact would be mitigated through implementation of mitigation measure MM 4.6.2.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project, with additional appurtenant structures. As such, this alternative would also have the potential to experience strong ground shaking in the event of seismic activity. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.6.2. Therefore, Alternative 3 would result in similar conditions related to seismic ground shaking as compared to the proposed project.

Project and Cumulative Erosion Impacts (Impacts 4.6.4 and 4.6.8)

The proposed project has the potential to result in soil erosion and contribute to cumulative soil erosion during ground-disturbing activities. This impact would be mitigated through compliance with NPDES permit requirements and through implementation of mitigation measures MM 4.3.2a, MM 4.6.2, MM 4.6.6, and MM 4.8.1.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project, with additional appurtenant structures, which will not require additional ground disturbance. As such, this alternative would include similar ground-disturbing construction activities that could result in soil erosion. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measures MM 4.3.2a, MM 4.6.2, MM 4.6.6, and MM 4.8.1. Therefore, Alternative 3 would result in similar conditions related to soil erosion as compared to the proposed project.

Expansive Soil (Impact 4.6.6)

The project site contains expansive soils potentially affecting the proposed structures. This impact would be mitigated through implementation of mitigation measure MM 4.6.6.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, the structures proposed under this alternative could also be affected by the expansive soils present on the site. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.6.6. Therefore, Alternative 3 would result in similar conditions related to expansive soils as compared to the proposed project.

Hazardous Materials/Public Health

Hazard to the Public through Routine Transport, Use, Disposal, or Accidental Release of Hazardous Materials (Impacts 4.7.1 and 4.7.3)

Implementation of the proposed project would result in the use, storage, and disposal of hazardous materials during both construction and operation and could potentially result in the accidental release of hazardous materials. This impact would be mitigated through implementation of mitigation measures MM 4.7.1a and MM 4.7.1b.

6.0 ALTERNATIVES

Under Alternative 3, a geothermal energy facility would be operated on the project site similar to the proposed project and could result in the routine transport, use, disposal, and/or accidental release of hazardous materials in the vicinity. However, this impact could be mitigated through implementation of mitigation measures MM 4.7.1a and MM 4.7.1b. Therefore, Alternative 3 would result in similar conditions related to hazardous materials as compared to the proposed project.

Public Airport Hazards (Impact 4.7.4)

Operation of the proposed facility in proximity to an airport could pose a safety risk to employees and aircraft taking off from or approaching the airport. This impact would be mitigated through implementation of mitigation measure MM 4.7.4.

Under Alternative 3, a geothermal energy facility would be operated on the project site similar to the proposed project, thereby posing a safety risk to employees and aircraft. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measure MM 4.7.4. Therefore, Alternative 3 would result in similar conditions related to airport hazards as compared to the proposed project.

Interfere with Emergency Plans (Impact 4.7.6)

The proposed project would result in increased demand for emergency services, thereby potentially affecting response times and implementation of emergency response and evacuation plans. This impact would be mitigated through implementation of mitigation measures MM 4.7.1b.

Under Alternative 3, a geothermal energy facility would be operated on the project site, resulting in increased demand for emergency services similar to the proposed project. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measures MM 4.7.1b. Therefore, Alternative 3 would result in similar conditions related to emergency plans as compared to the proposed project.

Hydrology and Water Quality

Construction-Phase Water Quality Impacts (Impact 4.8.1)

Construction of the proposed project, including soil-disturbing activities, could result in erosion and sedimentation or release of other pollutants to local waterways. This impact would be mitigated through implementation of mitigation measure MM 4.8.1.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would include similar activities that could result in erosion and sedimentation and release of other pollutants to local waterways. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.8.1. Therefore, Alternative 3 would result in similar conditions related to construction-phase water quality as compared to the proposed project.

Substantially Degrade Water Quality: Operational Water Quality Impacts (Impact 4.8.2)

Operation of the proposed project would introduce impervious surfaces and structures to the project site, resulting in increased runoff and the release of pollutants to local waterways. This impact would be mitigated through implementation of mitigation measure MM 4.8.2.

Under Alternative 3, a geothermal energy facility would be operated on the project site, resulting in increased runoff and the release of pollutants to local waterways. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.8.2. Therefore, Alternative 3 would result in similar conditions related to operational water quality as compared to the proposed project.

Cumulative Hydrology and Water Quality Impacts (Impact 4.8.3 and 4.8.5)

Implementation of the proposed project would contribute to an increase in impervious surface areas and cumulative water quality degradation, changes to runoff patterns, and the potential for increased flooding within the watershed. However, this contribution would be minimized through project design, including the use of retention basins, through compliance with the applicable NPDES permits, and through implementation of mitigation measures MM 4.8.1 and MM 4.8.2.

Under Alternative 3, a geothermal energy facility would be developed and operated on the project site similar to the proposed project, resulting in a potentially significant contribution to cumulative water quality degradation, changes to runoff patterns, and increases in flooding potential. However, similar to the proposed project, this contribution would be minimized through project design, compliance with applicable NPDES permits, and implementation of mitigation measures MM 4.8.1 and MM 4.8.2.

In addition, this alternative would utilize groundwater from the underlying aquifer as cooling tower makeup water during summer heat conditions, rather than using surface water purchased from IID. This could result in a significant contribution to cumulative impacts to groundwater levels and land subsidence due to groundwater withdrawal. As described above, should this alternative be selected, the project applicant would implement a mitigation program to monitor and prevent subsidence. However, as Alternative 3 would have the potential to impact groundwater levels and result in land subsidence, it would result in worse conditions related to cumulative hydrology and water quality impacts as compared to the proposed project.

Land Use and Planning

Incompatibility with Adjacent Land Uses (Impact 4.9.2)

Development of the proposed geothermal energy facility in a primarily agricultural area could result in land use incompatibilities. This impact would be mitigated through implementation of mitigation measures MM 4.9.2a and MM 4.9.2b.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project, with additional appurtenant structures. As such, this alternative would result in similar land use compatibility issues. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measures MM 4.9.2a and MM 4.9.2b. Therefore, Alternative 3 would result in similar conditions related to land use compatibility as compared to the proposed project.

Noise

As identified in Section 4.10, Noise, the proposed project would not result in any significant impacts associated with noise.

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Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project. The proposed alternative water supply would not significantly affect projected noise levels associated with construction or operation of the proposed plant. Therefore, Alternative 3 would also avoid significant impacts related to noise.

Public Services

Individual and Cumulative Increased Demand for Fire Protection Services (Impacts 4.11.1.2 and 4.11.1.3)

Implementation of the proposed project would result in an increase in demand for fire protection services and would contribute to a cumulative increase in demand for such services. This impact would be mitigated through implementation of mitigation measures MM 4.11.1.2a and MM 4.11.1.2b.

Under Alternative 3, a geothermal energy facility would be operated on the project site, resulting in increased demand for fire protection services similar to the proposed project. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measures MM 4.11.1.2 and MM 4.11.1.2b. Therefore, Alternative 3 would result in similar conditions related to fire protection services as compared to the proposed project.

Transportation and Circulation

As identified in Section 4.12, Transportation and Circulation, the proposed project would not result in any significant impacts associated with transportation and circulation.

Under Alternative 3, the project site would be developed as a geothermal energy facility similar to the proposed project, with additional appurtenant structures. The proposed alternative water supply would not affect projected vehicle trip generation associated with construction or operation of the proposed plant. Therefore, Alternative 3 would also avoid any significant impacts related to transportation and circulation.

Utilities

As identified in Section 4.13, Utilities, the proposed project would not result in any significant impacts associated with utilities.

As described above, Alternative 3 would not require any water from IID as groundwater would be utilized for cooling tower makeup water during summer heat conditions. As no water would be obtained from IID, Alternative 3 would result in better conditions related to utilities as compared to the proposed project.

Climate Change and Greenhouse Gases

Greenhouse Gas Emissions and Global Climate Change (Impacts 4.14.1 and 4.14.2)

GHG emissions for construction emissions and for project operations emissions would not result in a substantial net increase of CO₂e.

Under Alternative 3, a geothermal energy facility would be operated on the project site similar to the proposed project. As such, this alternative would not result in a substantial net increase of

CO₂e. Therefore, Alternative 3 would result in similar conditions related to greenhouse gas emissions and global climate change as compared to the proposed project.

6.6 ALTERNATIVE 4 – ALTERNATIVE WATER SUPPLY C ALTERNATIVE

DESCRIPTION OF ALTERNATIVE

Under Alternative 4, the Alternative Water Supply C Alternative, the proposed project would be designed, constructed, and operated similar to the proposed project. However, under this alternative, the project's entire water demand (5,500 AFY) would be supplied by the Imperial Irrigation District for the life of the project. No water would be obtained from the Brawley Wastewater Treatment Plant and no upgrades would be completed at the plant.

Similar to the proposed project, water would be obtained from IID Gate 131 on the Rockwood Canal located about one-half mile east of the power plant site. The water from the Rockwood Canal would be gravity fed or pumped in a 10- to 24-inch pipeline that would be either underground or put within the Livesley Drain that runs east to west between the canal and the power plant. No additional or altered infrastructure would be needed compared to the proposed project.

ENVIRONMENTAL ANALYSIS

The following analysis is based on the significant environmental impacts identified in Sections 4.1 through 4.14. The reader is referred to these sections for further details on impacts associated with the proposed project.

Aesthetics

Creation of Substantial Light and Glare (Impact 4.1.3)

The proposed project would introduce new sources of light and glare related to reflective building materials and vehicle glass. This impact is considered potentially significant, but would be mitigated through implementation of mitigation measure MM 4.1.3 requiring the use of neutral paint colors and only non-reflective building materials.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, new sources of light and glare could be created on the site from the use of reflective building materials as well from glass windows of parked vehicles. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.1.1. Therefore, Alternative 4 would result in similar conditions related to light and glare as compared to the proposed project.

Agricultural Resources

As identified in Section 4.2, Agricultural Resources, the proposed project would not result in any significant impacts associated with agriculture.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, a portion of the project site (approximately 32.75 acres) would be removed from agricultural production and developed with plant facilities and well pads. However, as discussed under Impacts 4.2.1 and 4.2.2, this alternative would be consistent with

6.0 ALTERNATIVES

Imperial County General Plan policies related to the preservation of Important Farmland and is therefore not considered to be a significant impact. Therefore, Alternative 4 would also avoid any significant impacts to agricultural resources.

Air Quality

Individually and Cumulatively Violate an Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation (Impacts 4.3.2, 4.3.3, and 4.3.7)

The proposed project would result in the emission of criteria air pollutants, potentially violating an air quality standard or contributing to an existing violation. These impacts would be mitigated through implementation of mitigation measures MM 4.3.2a, MM 4.3.2b, MM 4.3.3a, and MM 4.3.3b.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would result in similar air emissions that could violate an air quality standard or contribute to an existing standard violation. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.3.2a, MM 4.3.2b, MM 4.3.3a, and MM 4.3.3b. Therefore, Alternative 4 would result in similar conditions related to air emissions as compared to the proposed project.

Exposure of Public to Hazardous Air Pollutants (Impact 4.3.5)

The proposed project would result in the emission of the hazardous air pollutant (HAP) benzene. This impact would be mitigated through implementation of mitigation measure MM 4.3.5.

Under Alternative 4, a geothermal energy facility would be operated on the project site similar to the proposed project and would result in the emissions of the HAP benzene. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measure MM 4.3.5. Therefore, Alternative 4 would result in similar conditions related to the emissions of HAPs as compared to the proposed project.

Biological and Natural Resources

Impacts to Endangered, Threatened, and Other Listed Species (Impact 4.4.1)

The proposed project could result in impacts to the southwestern willow flycatcher if it is found to be present on the project site. This impact would be mitigated through implementation of mitigation measures MM 4.4.1a and MM 4.4.1b.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative could result in similar impacts to the southwestern willow flycatcher if it is found to be present on the project site. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.4.1a and MM 4.4.1b. Therefore, Alternative 4 would result in similar conditions related to endangered, threatened, and other listed species as compared to the proposed project.

Impacts to Species of Concern, California Fully Protected, and Other Non-listed Special-Status Species (Impact 4.4.2)***Migratory Birds and Raptors (excluding the western burrowing owl)***

The proposed project could result in impacts to multiple species of migratory birds and raptors and their associated foraging and nesting habitats. This impact would be mitigated through implementation of mitigation measure MM 4.4.2a.

Other Special-status Mammal Species (American Badger)

The proposed project could result in impacts to the American badger if it is found to be present on or adjacent to the project site. This impact would be mitigated through implementation of mitigation measures MM 4.4.2b, MM 4.4.2c, and MM 4.4.2d.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative could result in similar impacts to migratory birds and raptors and other special-status mammal species. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.4.2a through MM 4.4.2d. Therefore, Alternative 4 would result in similar conditions related to species of concern, California fully protected, and other non-listed special-status species as compared to the proposed project.

Impacts to Western Burrowing Owl (Impact 4.4.3)

The proposed project could result in impacts to the western burrowing owl if it is found to be present on or adjacent to the project site. This impact would be mitigated through implementation of mitigation measures MM 4.4.2c, MM 4.4.2d, and MM 4.4.3.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative could result in similar impacts to the western burrowing owl. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.4.2c, MM 4.4.2d, and MM 4.4.3. Therefore, Alternative 4 would result in similar conditions related to the western burrowing owl as compared to the proposed project.

Impacts to Sensitive Biological Communities, Including Riparian Habitat (Impact 4.4.4)

The proposed project could result in disturbance, degradation, and removal of riparian habitat along the New River. This impact would be mitigated through implementation of mitigation measures MM 4.4.4a and MM 4.4.4b.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative could result in similar impacts to sensitive biological communities, including riparian habitat. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measures MM 4.4.4a and MM 4.4.4b. Therefore, Alternative 4 would result in similar conditions related to sensitive biological communities, including riparian habitat, as compared to the proposed project.

6.0 ALTERNATIVES

Impacts to Jurisdictional Wetlands and Waters of the U.S. (Impact 4.4.5)

The proposed project could result in impacts to jurisdictional wetlands and waters of the U.S., including the New River and several irrigation canals. This impact would be mitigated through implementation of mitigation measure MM 4.4.5.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative could result in impacts to jurisdictional wetlands and waters of the U.S., including the New River and several irrigation canals. However, similar to the proposed project, this impact would be mitigated through implementation of mitigation measure MM 4.4.5. Therefore, Alternative 4 would result in similar conditions related to jurisdictional wetlands and waters of the U.S. as compared to the proposed project.

Cumulative Impacts to Special-Status and Sensitive Species (Impact 4.4.8)

The proposed project would contribute to a cumulative reduction of drainage water draining to the Salton Sea, potentially impacting special-status and sensitive species that inhabit the area. This impact would be mitigated through implementation of mitigation measures MM 4.4.1 through MM 4.4.5.

Under Alternative 4, water would be obtained entirely from IID. Similar to the proposed project, this water would eventually be injected back into the geothermal reservoir. As this water would otherwise drain to the New River, and ultimately the Salton Sea, as either irrigation water applied to agricultural fields or municipal water that would eventually be treated and discharged at the Brawley Wastewater Treatment Plant (BWWTP), this alternative would contribute to a cumulative reduction of water draining to the Salton Sea. Therefore, Alternative 4 would result in similar conditions related to cumulative impacts to special-status and sensitive species as compared to the proposed project.

Cultural Resources

Individual and Cumulative Impacts to Prehistoric, Historic and Paleontological Resources, and Human Remains (Impacts 4.5.1, 4.5.2, 4.5.3, and 4.5.4)

The proposed project could potentially disturb unknown cultural and/or paleontological resources or human remains during ground-disturbing activities. These impacts would be mitigated through implementation of mitigation measures MM 4.5.1a, MM 4.5.1b, and MM 4.5.2.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would include similar ground-disturbing construction activities that could disturb unknown cultural and/or paleontological resources or human remains on the project site. However, this impact could be mitigated through implementation of mitigation measures MM 4.5.1a, MM 4.5.1b, and MM 4.5.2. This alternative would not result in any improvements or associated ground-disturbing activities at the BWWTP; however, this site has been previously developed and no impacts related to prehistoric, historic or paleontological resources, and human remains are anticipated at this location under either scenario. Therefore, Alternative 4 would result in similar conditions related to cultural and paleontological resources and human remains as compared to the proposed project.

Geology and Soils

Seismic Ground Shaking Impacts (Impact 4.6.2)

Due to its proximity to regional faults, the proposed project has the potential to experience strong ground shaking in the event of seismic activity. This impact would be mitigated through implementation of mitigation measure MM 4.6.2.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would also have the potential to experience strong ground shaking in the event of seismic activity. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.6.2. Therefore, Alternative 4 would result in similar conditions related to seismic ground shaking as compared to the proposed project.

Project and Cumulative Erosion Impacts (Impact 4.6.4 and 4.6.8)

The proposed project has the potential to result in soil erosion and contribute to cumulative soil erosion during ground-disturbing activities. This impact would be mitigated through compliance with NPDES permit requirements and through implementation of mitigation measures MM 4.3.2a, MM 4.6.2, MM 4.6.6, and MM 4.8.1.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would include similar ground-disturbing construction activities that could result in soil erosion on the project site. Compliance with NPDES permit requirements and implementation of mitigation measures MM 4.3.2a, MM 4.6.2, MM 4.6.6, and MM 4.8.1 would mitigate this impact. However, this alternative would not include any ground-disturbing activities at the BWWTP and would therefore have less potential to result in soil erosion. Therefore, Alternative 4 would result in better conditions related to soil erosion as compared to the proposed project.

Expansive Soil (Impact 4.6.6)

The project site contains expansive soils potentially affecting the proposed structures. This impact would be mitigated through implementation of mitigation measure MM 4.6.6.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, the structures proposed under this alternative could also be affected by the expansive soils present on the site. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.6.6. Therefore, Alternative 4 would result in similar conditions related to expansive soils as compared to the proposed project.

Hazardous Materials/Public Health

Hazard to the Public through Routine Transport, Use, Disposal, or Accidental Release of Hazardous Materials (Impacts 4.7.1 and 4.7.3)

Implementation of the proposed project would result in the use, storage, and disposal of hazardous materials during both construction and operation and could potentially result in the accidental release of hazardous materials. This impact would be mitigated through implementation of mitigation measures MM 4.7.1a and MM 4.7.1b.

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Under Alternative 4, a geothermal energy facility would be operated on the project site similar to the proposed project and could result in the routine transport, use, disposal, and/or accidental release of hazardous materials in the vicinity. However, this impact could be mitigated through implementation of mitigation measures MM 4.7.1a and MM 4.7.1b. Therefore, Alternative 4 would result in similar conditions related to hazardous materials as compared to the proposed project.

Public Airport Hazards (Impact 4.7.4)

Operation of the proposed facility in proximity to an airport could pose a safety risk to employees and aircraft taking off from or approaching the airport. This impact would be mitigated through implementation of mitigation measure MM 4.7.4.

Under Alternative 4, a geothermal energy facility would be operated on the project site similar to the proposed project, thereby posing a safety risk to employees and aircraft. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.7.4. Therefore, Alternative 4 would result in similar conditions related to airport hazards as compared to the proposed project.

Interfere with Emergency Plans (Impact 4.7.6)

The proposed project would result in increased demand for emergency services, thereby potentially affecting response times and implementation of emergency response and evacuation plans. This impact would be mitigated through implementation of mitigation measures MM 4.7.1b.

Under Alternative 4, a geothermal energy facility would be operated on the project site, resulting in increased demand for emergency services similar to the proposed project. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measures MM 4.7.1b. Therefore, Alternative 4 would result in similar conditions related to emergency plans as compared to the proposed project.

Hydrology and Water Quality

Construction-Phase Water Quality Impacts (Impact 4.8.1)

Construction of the proposed project, including soil-disturbing activities, could result in erosion and sedimentation or release of other pollutants to local waterways. This impact would be mitigated through implementation of mitigation measure MM 4.8.1.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would include similar activities that could result in erosion and sedimentation and release of other pollutants to local waterways. Implementation of MM 4.8.1 would mitigate this impact. However, this alternative would not include any ground-disturbing construction activities at the BWWTP and would therefore have less potential to result in erosion and related water quality degradation. Therefore, Alternative 4 would result in better conditions related to construction-phase water quality as compared to the proposed project.

Substantially Degrade Water Quality: Operational Water Quality Impacts (Impact 4.8.2)

Operation of the proposed project would introduce impervious surfaces and structures to the project site, resulting in increased runoff and the release of pollutants to local waterways. This impact would be mitigated through implementation of mitigation measure MM 4.8.2.

Under Alternative 4, a geothermal energy facility would be operated on the project site, resulting in increased runoff and the release of pollutants to local waterways. Similar to the proposed project, this impact could be mitigated through implementation of mitigation measure MM 4.8.2. However, this alternative would not include upgrades to the Brawley Wastewater Treatment Plant to provide tertiary level treatment. As such, water discharged from the BWWTP would be of poorer quality compared to the proposed project. Therefore, Alternative 4 would result in worse conditions related to operational water quality as compared to the proposed project.

Cumulative Hydrology and Water Quality Impacts (Impact 4.8.3 and 4.8.5)

Implementation of the proposed project would contribute to an increase in impervious surface area and cumulative water quality degradation, changes to runoff patterns, and the potential for increased flooding within the watershed. However, this contribution would be minimized through project design, including the use of retention basins, through compliance with the applicable NPDES permits, and through implementation of mitigation measures MM 4.8.1 and MM 4.8.2.

Under Alternative 4, a geothermal energy facility would be developed and operated on the project site similar to the proposed project, resulting in a potentially significant contribution to cumulative water quality degradation, changes to runoff patterns, and increases in flooding potential. However, similar to the proposed project, this contribution would be minimized through project design, compliance with applicable NPDES permits, and implementation of mitigation measures MM 4.8.1 and MM 4.8.2.

In addition, this alternative would not include upgrades to the Brawley Wastewater Treatment Plant to provide tertiary level treatment. As such, water discharged from the BWWTP would be of poorer quality compared to the proposed project. Therefore, Alternative 4 would result in worse conditions related to cumulative hydrology and water quality impacts as compared to the proposed project.

Land Use and Planning**Incompatibility with Adjacent Land Uses (Impact 4.9.2)**

Development of the proposed geothermal energy facility in a primarily agricultural area could result in land use incompatibilities. This impact would be mitigated through implementation of mitigation measures MM 4.9.2a and MM 4.9.2b.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. As such, this alternative would result in similar land use compatibility issues. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measures MM 4.9.2a and MM 4.9.2b. Therefore, Alternative 4 would result in similar conditions related to land use compatibility as compared to the proposed project.

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Noise

As identified in Section 4.10, Noise, the proposed project would not result in any significant impacts associated with noise.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. The proposed alternative water supply would not significantly affect projected noise levels associated with construction or operation of the proposed plant. Therefore, Alternative 4 would also avoid significant impacts related to noise.

Public Services

Individual and Cumulative Increased Demand for Fire Protection Services (Impacts 4.11.1.2 and 4.11.1.3)

Implementation of the proposed project would result in an increase in demand for fire protection services and would contribute to a cumulative increase in demand for such services. This impact would be mitigated through implementation of mitigation measures MM 4.11.1.2 and MM 4.11.1.2b.

Under Alternative 4, a geothermal energy facility would be operated on the project site, resulting in increased demand for fire protection services similar to the proposed project. However, similar to the proposed project, this impact could be mitigated through implementation of mitigation measures MM 4.11.1.2 and MM 4.11.1.2b. Therefore, Alternative 4 would result in similar conditions related to fire protection services as compared to the proposed project.

Transportation and Circulation

As identified in Section 4.12, Transportation and Circulation, the proposed project would not result in any significant impacts associated with transportation and circulation.

Under Alternative 4, the project site would be developed as a geothermal energy facility similar to the proposed project. The proposed alternative water supply would not affect projected vehicle trip generation associated with construction or operation of the proposed plant. Therefore, Alternative 4 would also avoid any significant impacts related to transportation and circulation.

Utilities

As identified in Section 4.13, Utilities, the proposed project would not result in any significant impacts associated with utilities.

Under Alternative 4, the project's entire water demand would be supplied by the Imperial Irrigation District. IID has determined that it has sufficient water supplies to meet the current and projected future water demands of its service area and has allocated 25,000 AFY for industrial projects. However, the proposed project would obtain most of its water supply (4,369 AFY) by treating and reusing wastewater from the adjacent Brawley Wastewater Treatment Plant. The use of reclaimed water would result in substantially lessened environmental impacts. Therefore, Alternative 4 would result in worse conditions related to utilities as compared to the proposed project.

Climate Change and Greenhouse Gases

Greenhouse Gas Emissions and Global Climate Change (Impacts 4.14.1 and 4.14.2)

GHG emissions for construction emissions and for project operations emissions would not result in a substantial net increase of CO₂e.

Under Alternative 4, a geothermal energy facility would be operated on the project site similar to the proposed project. As such, this alternative would not result in a substantial net increase of CO₂e. Therefore, Alternative 4 would result in similar conditions related to greenhouse gas emissions and global climate change as compared to the proposed project.

6.7 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Based upon the evaluation described in this section, the No Project Alternative (Alternative 1) is considered the environmentally superior alternative, as it would avoid all significant adverse impacts associated with the proposed project. The No Project Alternative was determined to have fewer adverse environmental impacts than the proposed project on all issues.

Under CEQA Guidelines Section 15126.6 (e)(2), if the environmentally superior alternative is the No Project Alternative, another environmentally superior alternative must be selected from the other alternatives analyzed. For this analysis, after the No Project Alternative, the Alternative Water Supply A Alternative is considered the environmentally superior alternative.

Table 6.0-1, below, provides a summary of the potential impacts of the alternatives evaluated in this section, as compared with the potential impacts of the proposed project.

6.0 ALTERNATIVES

**TABLE 6.0-1
SUMMARY COMPARISON OF ALTERNATIVES**

Environmental Impacts	Proposed Project	Alternative 1	Alternative 2	Alternative 3	Alternative 4
4.1 Aesthetics					
Creation of Substantial Light and Glare (Impact 4.1.3)	Less Than Significant with Mitigation	B	S	S	S
4.2 Agricultural Resources					
No significant impacts were identified in this section.					
4.3 Air Quality					
Violate an Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation (Impacts 4.3.2)	Less Than Significant with Mitigation	B	S	S	S
Violate Air Quality Standards Due to Long-Term Operational Emissions of Criteria Air Pollutants (Impact 4.3.3)	Less Than Significant with Mitigation	B	S	S	S
Exposure of Public to Hazardous Air Pollutants (Impact 4.3.5)	Less Than Significant with Mitigation	B	S	S	S
Biological Resources					
Impacts to Endangered, Threatened, and Other Listed Species (Impact 4.4.1)	Less Than Significant with Mitigation	B	S	S	S
Impacts to Species of Concern, California Fully Protected, and Other Non-listed Special-Status Species (Impact 4.4.2)	Less Than Significant with Mitigation	B	S	S	S
Impacts to Western Burrowing Owl (Impact 4.4.3)	Less Than Significant with Mitigation	B	S	S	S
Impacts to Sensitive Biological Communities, Including Riparian Habitat (Impact 4.4.4)	Less Than Significant with Mitigation	B	S	S	S
Impacts to Jurisdictional Wetlands and Waters of the U.S. (Impact 4.4.5)	Less Than Significant with Mitigation	B	S	S	S

Environmental Impacts	Proposed Project	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Cumulative Impacts to Special-Status and Sensitive Species (Impact 4.4.8)	Less Than Significant with Mitigation	B	B	B	S
4.5 Cultural Resources					
Impacts to Prehistoric Resources (Impact 4.5.1)	Less Than Significant with Mitigation	B	S	S	S
Project Impacts to Paleontological Resources (Impact 4.5.2)	Less Than Significant with Mitigation	B	S	S	S
Cumulative Impacts to Prehistoric, Historic Resources, and Human Remains (Impact 4.5.3)	Less Than Significant with Mitigation	B	S	S	S
Cumulative Impacts to Paleontological Resources (Impact 4.5.4)	Less Than Significant with Mitigation	B	S	S	S
4.6 Geology and Soils					
Seismic Ground Shaking Impacts (Impact 4.6.2)	Less Than Significant with Mitigation	B	S	S	S
Erosion Impacts (Impact 4.6.4)	Less Than Significant with Mitigation	B	S	S	B
Cumulative Geology and Soils Impacts (Impact 4.6.7)	Less Than Significant with Mitigation	B	S	S	S
4.7 Hazardous Materials/Public Health					
Hazards to the Public through Routine Transport, Use, or Disposal of Hazardous Materials (Impact 4.7.1)	Less Than Significant with Mitigation	B	S	S	S
Accidental Release of Hazardous Materials (Impact 4.7.3)	Less Than Significant with Mitigation	B	S	S	S
Airport Hazards (Impact 4.7.4)	Less Than Significant with Mitigation	B	S	S	S
Interfere with Emergency Plans (Impact 4.7.6)	Less Than Significant with Mitigation	B	S	S	S
4.8 Hydrology and Water Quality					
Construction Phase Water Quality Impacts (Impact 4.8.1)	Less Than Significant with Mitigation	B	S	S	B
Substantially Degrade Water Quality: Operational Water Quality Impacts (Impacts 4.8.2)	Less Than Significant with Mitigation	B	S	S	W

6.0 ALTERNATIVES

Environmental Impacts	Proposed Project	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Cumulative Hydrology and Water Quality Impacts (Impact 4.8.5)	Less Than Significant with Mitigation	B	S	W	W
4.9 Land Use and Planning					
Incompatibility with Adjacent Land Uses (Impact 4.9.2)	Less Than Significant with Mitigation	B	S	S	S
4.10 Noise					
No significant impacts were identified in this section.					
4.11 Public Services					
Increased Demand for Fire Protection Services (Impact 4.11.1.2)	Less Than Significant with Mitigation	B	S	S	S
Cumulative Fire Protection Services Impacts (Impact 4.11.1.3)	Less Than Significant with Mitigation	B	S	S	S
4.12 Transportation and Circulation					
No significant impacts were identified in this section.					
4.13 Utilities					
No significant impacts were identified in this section.					
4.14 Climate Change and Greenhouse Gases					
Greenhouse Gas Emissions and Global Climate Change (Impact 4.14.1)	Less Than Significant with Mitigation	W	S	S	S
Conflict with Any Applicable Plan, Policy or Regulation (Impact 4.14.2)	Less Than Significant with Mitigation	W	S	S	S

Notes:

B: Alternative would result in better conditions than the proposed project.

S: Alternative would result in similar conditions as the proposed project.

W: Alternative would result in worse impacts than the proposed project.

7.0 CEQA-MANDATED SECTIONS

This section of the Draft Environmental Impact Report (Draft EIR or DEIR) discusses the additional topics statutorily required by the California Environmental Quality Act (CEQA): significant and unavoidable environmental impacts and growth-inducing impacts.

7.1 SIGNIFICANT AND UNAVOIDABLE ENVIRONMENTAL EFFECTS

CEQA Guidelines Section 15126.2(b) requires an environmental impact report (EIR) to discuss unavoidable significant environmental effects, including those that can be mitigated but not reduced to a level of insignificance. In addition, Section 15093(a) of the CEQA Guidelines allows the decision-making agency to determine if the benefits of a proposed project outweigh the unavoidable adverse environmental impacts of implementing the project. The County of Imperial can approve a project with unavoidable adverse impacts if it prepares a Statement of Overriding Considerations setting forth the specific reasons for making such a judgment.

The proposed project would not result in any significant and unavoidable adverse impacts.

7.2 GROWTH-INDUCING IMPACTS

INTRODUCTION

CEQA Guidelines Section 15126.2[d] requires that an EIR evaluate the growth-inducing impacts of a proposed action. A "growth-inducing impact" is defined by the State CEQA Guidelines as follows:

... the way in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth . . . It is not assumed that growth in an area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have direct and/or indirect growth inducement potential. Direct growth inducement could result if a project, for example, involved construction of new housing, thereby leading directly to an increase in population and use of area infrastructure in the project vicinity. A project could have indirect growth inducement potential, for example, if it established substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises) that would indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, a project could indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service. For example, a project providing an increased water supply in an area where water service historically limited growth could be considered growth inducing.

The State CEQA Guidelines further explain that the environmental effects of induced growth are considered indirect impacts of the proposed action. These indirect impacts or secondary effects of growth may result in significant, adverse environmental impacts. Potential secondary effects of growth include increased demand on other community and public services and infrastructure, increased traffic and noise, and adverse environmental impacts such as degradation of air and water quality, degradation or loss of plant and animal habitat, and conversion of agricultural and open space land to developed uses.

Growth inducement may constitute an adverse impact if the growth is not consistent with or accommodated by the land use plans and growth management plans and policies for the area affected. Local land use plans provide for land use development patterns and growth policies

7.0 CEQA-MANDATED SECTIONS

that allow for the orderly expansion of urban development supported by adequate urban public services, such as water supply, roadway infrastructure, sewer service, and solid waste service. A project that would induce “disorderly” growth (conflict with the local land use plans) could indirectly cause additional adverse environmental impacts and other public services impacts. Thus, to assess whether a growth-inducing project will result in adverse secondary effects, it is important to assess the degree to which the growth accommodated by a project would or would not be consistent with applicable land use plans.

COMPONENTS OF GROWTH

The timing, magnitude, and location of land development and population growth in a community or region are based on various interrelated land use and economic variables. Key variables include regional economic trends, market demand for residential and nonresidential uses, land availability and cost, the availability and quality of transportation facilities and public services, proximity to employment centers, the supply and cost of housing, and regulatory policies or conditions. Since the general plan of a community defines the location, type, and intensity of growth, it is the primary means of regulating development and growth in California.

PROJECT-SPECIFIC GROWTH-INDUCING IMPACTS

Growth Effects of the Project

As described in Chapter 3.0, Project Description, the East Brawley Geothermal Development project proposes to develop a geothermal energy production facility on the project site, which is currently used for agricultural production. The project would not include the construction of any housing or otherwise result in direct growth inducement.

The project would create approximately 25 new permanent employment opportunities as well as additional temporary construction jobs. It is anticipated that these jobs would be filled by residents of Brawley or other nearby communities in Imperial County. As such, there would be no need for additional housing or services to support the new employment demand. Furthermore, the project site is designated and zoned for geothermal uses. This minor increase in employment was considered in the Imperial County General Plan and associated EIR.

The proposed project would utilize existing roadways and Imperial Irrigation District’s existing water distribution system and would not support the development of adjacent properties by extending infrastructure to areas not previously served. The generation of additional kilowatts of energy in the region would not be considered a removal of an obstacle to additional growth and development, as a lack of electrical service has not limited growth in the area in the past. Rather, the project’s objective is to develop and operate a geothermal project and assist with meeting federal, state, and local clean and renewable energy goals. Furthermore, the proposed upgrades to the Brawley Wastewater Treatment Plant would not increase the plant’s capacity or otherwise indirectly induce growth.

7.3 MANDATORY FINDINGS OF SIGNIFICANCE

State CEQA Guidelines Section 15065 identifies four mandatory findings of significance that must be considered as part of the environmental review process of a project. These findings are identified below with an analysis of the project’s relationship to these findings.

- 1) *Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop*

below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

The project's impacts on biological resource impacts and cultural resources are evaluated in Section 4.4, Biological and Natural Resources, and Section 4.5, Cultural Resources, of this DEIR, respectively. Section 4.4 identifies mitigation measures to reduce impacts to biological resources. Section 4.5 identifies mitigation measures to reduce impacts to cultural and paleontological resources. Upon implementation of the mitigation measures identified in these sections, a less than significant impact to the quality of the environment, habitat of fish and wildlife species, fish and wildlife species populations, plant and animal communities, the number and range of protected species, and cultural resources is anticipated to occur.

- 2) *Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?*

The project would not result in the achievement of short-term environmental goals to the disadvantage of long-term environmental goals as a result of the project site being developed with a geothermal energy production plant. Sections 4.1 through 4.14 of this Draft EIR include analysis of the potential short-term (construction phase) and long-term (operation phase) impacts that could occur as a result of implementation of the proposed project. The analysis contained in these sections is based on existing environmental setting conditions, policy and regulatory conditions, proposed project characteristics, and where applicable, project-specific technical studies detailing both long- and short-term potential impacts. Because the proposed project would be required to implement mitigation measures to reduce impacts to less than significant levels, would be required to comply with all applicable regulatory requirements, and would require a Conditional Use Permit and other entitlements for approval, implementation of the proposed project would not preclude the County from meeting its long-term environmental goals. Rather, the proposed project, as a renewable energy project, would assist the County in meeting its long-term environmental goals related to renewable energy production and use and compliance with AB 32.

- 3) *Does the project have impacts that are individually limited, but cumulatively considerable? "Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future project.*

The proposed project's potential cumulative impacts are summarized in Section 5.0 of this DEIR. Sections 4.1 through 4.14 evaluate cumulative impacts related to each technical discussion area and, when applicable, identify mitigation measures to lessen cumulative impacts. Upon implementation of the mitigation measures identified in these sections, project impacts are anticipated to be less than cumulatively considerable.

- 4) *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*

Potential human-related impacts are discussed and evaluated in Section 4.3, Air Quality, Section 4.7, Hazardous Materials/Public Health, and Section 4.10, Noise. Each section identifies mitigation measures to reduce significant impacts associated with these resource areas. The project would comply with all required regulatory/legal requirements and mitigation measures. Upon implementation of the mitigation measures identified in these sections, direct and indirect project impacts to human beings are anticipated to be less than significant.

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